



# 2009 Annual Report Nonpoint Source





Cover Page Photo: Upper Marsh Bayou

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# *Acronyms and Abbreviations*

<b>BMP</b>	.....Best Management Practice
<b>BTNEP</b>	.....Barataria Terrebonne National Estuary Program
<b>CNPCP</b>	.....Coastal Nonpoint Pollution Control Program
<b>CREP</b>	.....Conservation Reserve Enhancement Program
<b>CRP</b>	.....Conservation Reserve Program
<b>CSP</b>	.....Conservation Security Program
<b>DO</b>	.....Dissolved Oxygen
<b>EPA</b>	.....Environmental Protection Agency
<b>EQIP</b>	.....Environmental Quality Incentive Program
<b>ERC</b>	.....Environmental Regulatory Code
<b>FBMP</b>	.....Forestry Best Management Practice
<b>FY</b>	.....Fiscal Year
<b>GIS</b>	.....Geographic Information System
<b>GOMA</b>	.....Gulf of Mexico Alliance
<b>GOMP</b>	.....Gulf of Mexico Program
<b>GRP</b>	.....Grasslands Reserve Program
<b>IR</b>	.....Integrated Report
<b>LDAF</b>	.....Louisiana Department of Agriculture and Forestry
<b>LDEQ</b>	.....Louisiana Department of Environmental Quality
<b>LDHH</b>	.....Louisiana Department of Health and Hospitals
<b>LDNR</b>	.....Louisiana Department of Natural Resources
<b>LMRCC</b>	.....Lower Mississippi River Conservation Committee
<b>LPBF</b>	.....Lake Pontchartrain Basin Foundation
<b>MOU</b>	.....Memorandum of Understanding
<b>MUS</b>	.....Marsh Upwelling System
<b>NPS</b>	.....Nonpoint Source
<b>RC&amp;D</b>	.....Resource Conservation and Development
<b>SWCD</b>	.....Soil and Water Conservation District
<b>TMDL</b>	.....Total Maximum Daily Load
<b>USDA</b>	.....U.S. Department of Agriculture
<b>WHIP</b>	.....Wildlife Habitat Incentive Program
<b>WRP</b>	.....Wetlands Reserve Program



# *Executive Summary*

The Louisiana Department of Environmental Quality (LDEQ) is the state's lead agency for the Nonpoint Source Management Program. They are responsible for planning, managing and coordinating nonpoint source related activities. The State of Louisiana has identified agriculture, forestry, urban runoff, home sewage systems, sand and gravel mining operations, construction activities and hydromodification as the types of nonpoint sources of water pollution that need to be managed, if the goals of the Clean Water Act are to be met. Whereas, some of these activities now have permits associated with them, LDEQ's NPS Program remains involved in some aspects of working on these types of pollution problems.

During 2009, the State of Louisiana continued to make progress in implementing the Nonpoint Source (NPS) Management Plan. This progress is made through the collaborative efforts of many partners that work on solving water quality problems within Louisiana. A major revision of the NPS Management Plan was finalized and provided to the NPS Interagency Committee for their review and comment. The Memorandum of Understanding (MOU) was signed by the agencies and nonprofit organizations that work together to implement the state's plan. During 2010, the revised NPS Management Plan will be provided to the public for review and comment and will then be officially submitted to the U.S. Environmental Protection Agency (USEPA) Region 6 for final approval.

In addition to revising the NPS Management Plan, LDEQ was able to publish success stories for the Tchefuncte and Bogue Falaya Rivers on the USEPA national website (<http://www.epa.gov/nps/Success319/>). After more than 10 years of working to improve water quality in the Tchefuncte and Bogue Falaya Rivers, the 2008 Integrated Report indicated that the river was fully meeting the primary and secondary contact recreational uses. This success resulted from many partners working together to reduce pollution from individual home sewage systems and small package plants. LDEQ is currently working another Success Story for Bayou Plaquemine Brule that should be published on USEPA's website in 2010.

Since agriculture and forestry activities occupy such a large percentage of Louisiana's land, strong partnerships with the U.S. Department of Agriculture and the Louisiana Department of Agriculture and Forestry (LDAF) are essential components in the state's NPS Management Plan. The Office of Soil and Water Conservation within the LDAF applies for half of the Section 319 funds each year in order to implement best management practices within watersheds where total maximum daily loads (TMDLs) have been completed and Watershed Implementation Plans written. USDA has federal funds through the 2009 Farm Bill to implement best management practices so LDEQ continues to work with them on how those funds can be directed toward the state's water quality problems.



# *Executive Summary*

In addition to the work done with the agricultural partners, LDEQ focused its attention on urban, construction and home sewage problems that exist within the state. The Source Water Protection Program and the NPS Program both worked on cost-share programs to replace failing sewage systems and to educate the public on the importance of maintaining their existing systems. Highlights of these programs are included within this 2009 NPS Annual Report. Parts of Louisiana have experienced rapid growth and development, so emphasis has been placed on working with parishes on new ordinances that require the use of BMPs for all new developments and re-developments, as well as, new ordinances to address home sewage systems.

The NPS program has already resulted in reduction of nonpoint source pollution and water quality improvement in some parts of the state. These improvements are expected to continue as more water bodies are targeted for watershed implementation. The success of this program is largely attributed to the effective collaboration of federal, state, and local governments, as well as universities and non-profit organizations. It is essential to the continued progress of the program that this effective collaboration be maintained and expanded in 2010.

Highlights of the State's NPS Management Program for 2009 include:

- LDEQ initiated a statewide media campaign for water quality;
- LDEQ continued implementing 26 projects within the state to reduce the amount of nonpoint source pollution entering the state's water bodies;
- LDEQ established nine (9) watershed coordinators within the RC&D councils around the state and the LPBF;
- LDEQ continued to work through their GIS Center on detailed satellite imagery classification of land-uses for the Mermentau River Basin and the Vermilion-Teche River Basin. This data will be utilized for Watershed Implementation Plans for impaired water bodies;
- LDAF continued to implement targeted BMP agricultural programs in priority watersheds where TMDLs and Watershed Implementation Plans have been completed;
- LDEQ updated the NPS website with additional 319 projects and watershed plans;
- Revised three and begun revisions of eight Watershed Implementation Plans for impaired water bodies which have had total maximum daily loads (TMDLs) completed for them within the Mermentau, Ouachita, and Vermilion-Teche River Basins;
- Began working on six new Watershed Implementation Plans for impaired water bodies within the Red River and Lake Pontchartrain Basins;
- Tracked and managed the spending of over \$1.5 million of Section 319 grant funds.



# Executive Summary

In the upcoming year, LDEQ looks forward to continuing NPS program efforts in accordance with established long-term program goals through identifying and initiating projects aimed at producing measurable water quality improvement. LDEQ will be working to further engage our NPS program partners in Watershed Implementation Planning and implementation as an integral element for the overall efforts to achieve the state's water quality improvement goals. Aspects of the NPS program may be woven into other LDEQ program efforts such as water quality permits, surveillance, enforcement, planning, and public outreach in order to systematically implement a watershed approach to improve water quality in Louisiana. During 2009, LDEQ will be working with watershed coordinators and groups to focus the efforts of the NPS Management Plan more directly to the local level where BMPs need to be implemented. LDEQ has launched a public outreach program that involved radio, television and billboards all focused on raising the awareness about water quality and watershed issues.





# NPS Program Funds

Section 319(h) of the Clean Water Act established an annual grant that Congress allocates to the states through EPA to be used for nonpoint source-related activities that support the goals of the Act. Louisiana's allocated funds are split between LDEQ and the Louisiana Department of Agriculture and Forestry (LDAF). The incremental funds which are received by LDAF are strictly used for the implementation of agriculture and forestry BMPs in watersheds for which Watershed Implementation Plans and TMDLs have been completed.

The base funds which are awarded to LDEQ are available for a wider range of activities, including Watershed Implementation Planning and working with cities, parishes and local organizations on watershed implementation. LDEQ's portion of the grant is used to fund specific nonpoint source projects that are designed for reduction of NPS pollution, evaluation of the effectiveness of projects to improve water quality and educational projects designed to increase public awareness about nonpoint source pollution and the actions that can be taken to reduce and control it. In addition to the specific projects, Section 319 funds are also utilized to pay salaries of the staff that work on nonpoint source related activities.

The Louisiana Department of Environmental Quality expended over \$2.3 million of Section 319 base funds during Fiscal Year 2009 (Table 1) to implement 28 projects directed at reducing nonpoint source pollution and improving water quality. The Section 319 federal funds amounted to \$2,327,759 while \$1,302,121 were provided as matching funds.

Table 1. LDEQ Section 319 Funds Expended in FY2009			
Grant Year	Federal	Match	Total
2003	506,289	222,891	729,180
2004	698,377	234,973	933,350
2005	382,177	308,921	691,098
2007	740,916	535,336	1,276,252
<b>Total</b>	<b>2,327,759</b>	<b>1,302,121</b>	<b>3,629,880</b>

# NPS Program Funds

A total of 28 projects were implemented by the LDEQ NPS Program during FY2009 (Figure 1). Even though the largest percentage of projects were implemented statewide, there were still projects implemented in nearly every river basin in the state.

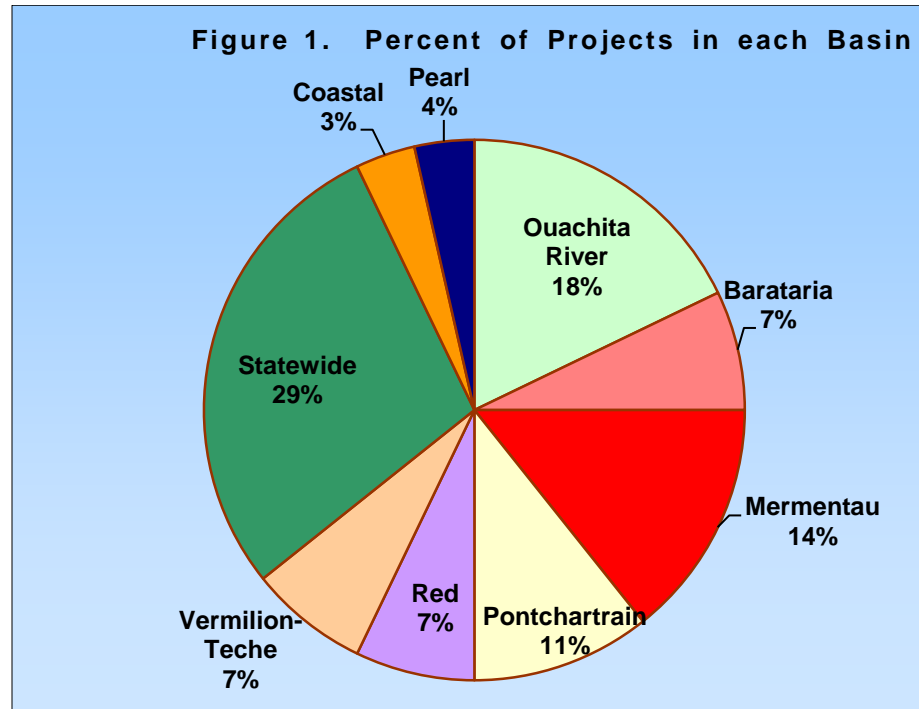
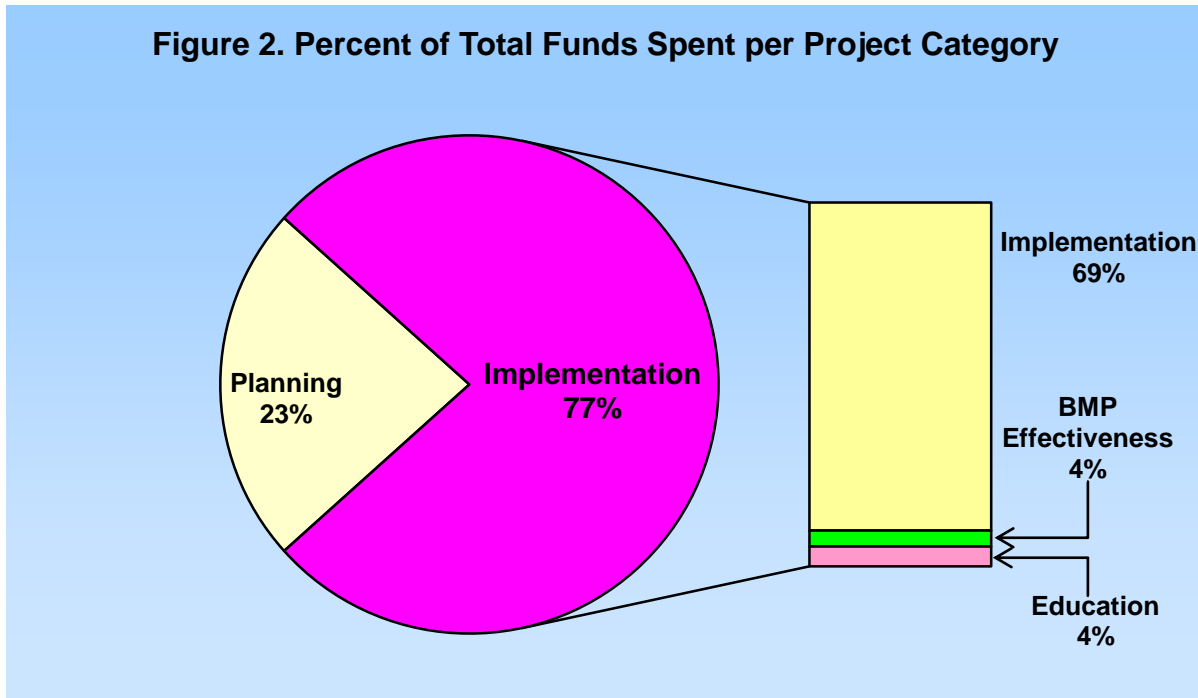


Table 2 shows how the federal and match funds were distributed among the basins. Since there were more statewide projects than projects in any one basin, there was also the largest percentage of funds spent on statewide projects.

Table 2. Total Funds Spent per Basin	
Basin	Total Funds Spent
Barataria	\$296,286
Calcasieu	\$3,555
Pontchartrain	\$184,356
Mermentau	\$280,912
Ouachita River	\$247,437
Pearl River	\$49,277
Red River	\$139,066
Vermilion-Teche	\$113,154
Coastal	\$68,500
Statewide*	\$2,250,892
*includes salaries, travel, supplies, operating costs, etc.	

# NPS Program Funds

Figure 2 shows how the Federal and Match funds were distributed among the four categories of projects. There are two main categories: Planning and Implementation. The categories of Education, Implementation, and BMP Effectiveness all fall under the main category of Implementation.





# *Meeting the NPS Milestones*

The Louisiana Department of Environmental Quality (LDEQ) outlined a 15-year timeline within the 2000 NPS Management Plan to implement a watershed strategy for the state. This timeline was expanded to meet the court-ordered schedule to develop TMDLs for all impaired water bodies by 2011. Within that timeline, LDEQ anticipated that it would take three cycles of water quality data collection over 15 years to see major water quality improvements as a result of watershed implementation. The NPS Management Plan has two main goals to accomplish by the year 2012: to restore the designated uses in 25% of the impaired water bodies and to remove water bodies from the 303(d) list of impaired waters.

During 2009, the state has adhered to this timeline. LDEQ has implemented projects and programs to reduce nonpoint source pollutants statewide. Specific details of these projects are provided within their respective sections of this report, and a complete list of projects is in Appendix A. Eight Watershed Implementation Plan revisions are being worked on for the Ouachita, Mermentau, Calcasieu, Barataria, and Vermilion-Teche River Basins. Three Watershed Implementation Plan revisions were completed for the Mermentau River Basin, and development began on six new plans for the Sabine River, Red River, and Lake Pontchartrain Basins. TMDLs were developed for impaired watersheds in the Lake Pontchartrain Basin. In FY2009, water quality surveys were conducted on nine water bodies in the Pontchartrain Basin. The water bodies were Bayou Liberty (040905 & 040906), Bayou Bonfouca (040907 & 040908), Jones Creek (040302), Clay Cut (040302), Upper Tchefuncte (040801), Bogue Falaya River (040804), Abita River (040804), Ponchitolawa Creek (040802) and Bayou LaCombe(040901 & 040902).



# Meeting the NPS Milestones

Table 3. Schedule of Milestones for Louisiana's NPS Management Program

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Mermentau	Black Stripes	Light Grey	Green	Green	Green	Black Stripes	Yellow	Yellow	Yellow	Yellow	Black Stripes	Blue	Blue	Blue	Blue	Black Stripes	Blue	Blue	Blue
Vermilion	Black Stripes	Light Grey	Green	Green	Green	Black Stripes	Yellow	Yellow	Yellow	Yellow	Black Stripes	Blue	Blue	Blue	Blue	Black Stripes	Blue	Blue	Blue
Calcasieu		Black Stripes	Light Grey	Light Grey	Light Grey	Green	Black Stripes	Yellow	Yellow	Yellow	Yellow	Black Stripes	Blue	Blue	Blue	Blue	Black Stripes	Blue	Blue
Ouachita		Black Stripes	Light Grey	Light Grey	Light Grey	Green	Black Stripes	Yellow	Yellow	Yellow	Yellow	Black Stripes	Blue	Blue	Blue	Blue	Black Stripes	Blue	Blue
Barataria			Black Stripes		Light Grey	Light Grey	Light Grey	Black Stripes	Green	Green	Yellow	Yellow	Black Stripes	Yellow	Blue	Blue	Blue	Black Stripes	Blue
Terrebonne			Black Stripes			Light Grey	Light Grey	Black Stripes	Light Grey	Light Grey	Green	Green	Black Stripes	Yellow	Yellow	Yellow	Yellow	Black Stripes	Blue
Pontchartrain				Black Stripes					Black Stripes	Light Grey	Light Grey	Light Grey	Light Grey	Black Stripes	Green	Green	Green	Yellow	Black Stripes
Pearl				Black Stripes					Black Stripes	Light Grey	Light Grey	Green	Green	Black Stripes	Yellow	Yellow	Yellow	Yellow	Black Stripes
Red					Black Stripes			Light Grey	Light Grey	Black Stripes	Green	Green	Green	Yellow	Black Stripes	Yellow	Yellow	Blue	Blue
Sabine					Black Stripes			Light Grey	Light Grey	Black Stripes	Green	Green	Green	Yellow	Black Stripes	Yellow	Yellow	Blue	Blue
Mississippi				Black Stripes					Black Stripes	Light Grey	Light Grey	Light Grey	Light Grey	Black Stripes	Green	Green	Yellow	Yellow	Black Stripes
Atchafalaya					Black Stripes				Light Grey	Black Stripes	Light Grey	Light Grey	Green	Green	Black Stripes	Yellow	Yellow	Yellow	Yellow

- 1- Black Stripes = Collect Water Quality Data to Develop Total Maximum Daily Loads (TMDLs) and to Track Water Quality Improvement at the Watershed Level
- 2- Light Grey = Develop Total Maximum Daily Loads for the Watersheds on the 303(d) List
- 3- Green = Develop Watershed Management Plans to Implement the NPS Component of the TMDL
- 4- Yellow = Implement the Watershed Management Plans
- 5- Blue = Develop and Implement Additional Corrective Actions Necessary to Restore the Designated Uses to the Water Bodies

# Ambient Monitoring Schedule

The 2008 IR contained new assessments for subsegments in all twelve Louisiana basins: Atchafalaya (01), Barataria (02), Calcasieu (03), Pontchartrain (04), Mermentau (05), Vermilion/Teche (06), Mississippi (07), Ouachita (08), Pearl (09), Red (10), Sabine (11), and Terrebonne (12). Louisiana's water quality monitoring and assessment program follows the four-year rotating basin approach shown in table 3.2.1. For the 2007 monitoring cycle, LDEQ changed from a calendar year rotation to a "water-year" rotation of October 1<sup>st</sup> – September 31<sup>st</sup>. This permits a full twelve months of water quality data to be collected in sufficient time to generate the Integrated Report by April 1st of even-numbered years.

LDEQ's four-year rotation monitoring program has a number of benefits over previous monitoring programs:

1. Water quality data from the same number of water bodies was collected over a shorter period of time, thus improving LDEQ's ability to identify and target newly developing problems in a timely manner.
2. Samples were collected statewide instead of in two or three basins per year, enabling LDEQ to monitor water quality issues on a broader regional scale.
3. Regional staff responsible for collection of samples remained skilled and up-to-date on the latest sampling procedures.
4. Regional staffs were able to balance their workloads more evenly instead of having two or three years in which they do little or no ambient water quality sampling and one year of intense field sampling at the expense of all other work.

**Table 3.2.1.**

**Monitoring and assessment schedule for Louisiana's four-year rotating basin plan.**

<b>Basin</b>	<b>First Monitoring Rotation</b>	<b>Second Monitoring Rotation</b>
Atchafalaya Basin (01)	2004, 2005	1.
Barataria Basin (02)	2004, 2005	1.
Calcasieu River Basin (03)	2004, 2005	1.
Lake Pontchartrain Basin (04)	2006, 2007	1.
Mermentau River Basin (05)	2004, 2005, 2006, 2007	1.
Vermilion-Teche River Basin (06)	2004, 2005, 2006, 2007	1.
Mississippi River Basin (07)	2004, 2005	1.
Ouachita River Basin (08)	2004, 2005	1.
Pearl River Basin(09)	2006, 2007	1.
Red River Basin (10)	2004, 2005, 2006, 2007	1.
Sabine River Basin (11)	2006, 2007	1.
Terrebonne Basin (12)	2004, 2005	1.

All subsegments will be sampled for one year (October 1 – September 31) at some point in time during the four year rotation.



# Implementation and Improvement

## ***Watershed Implementation Plans***

One of the strengths of Louisiana's NPS Program is the Watershed Implementation Planning and implementation strategy. This strategy utilizes TMDLs combined with detailed land-use classification from satellite imagery and watershed characterization. All of the completed TMDLs can be viewed on LDEQ's website at:

<http://www.deq.louisiana.gov/portal/default.aspx?tabid=1563>.

During 2009, the NPS staff and watershed coordinators worked on revising and initiating fifteen Watershed Implementation Plans within the Ouachita, Vermilion-Teche, Red, Barataria, Sabine, Calcasieu, and Lake Pontchartrain Basins. LDEQ staff completed the land use classification for the Mermentau River Basin, and completed the field work for the land use classification for the Vermilion-Teche River Basin.

Watershed Implementation Plans can be viewed on the Nonpoint Source Pollution Unit website at: <http://nonpoint.deq.louisiana.gov/wqa/WaterShedPlanning.htm>.

<b>Implementation Plans Focused on in 2009</b>	
<b>River Basin</b>	<b>Subsegment</b>
Ouachita	Bayou Lafourche (080904)
Ouachita	Big Creek (080903)
Ouachita	Bayou Macon (081001)
Ouachita	Tensas River (081201)
Ouachita	Lake St. Joseph (081202)
Vermilion-Teche	Vermilion River (060801,060802)
Vermilion-Teche	Bayou Teche (060301,060401)
Lake Pontchartrain	Ponchatoula Creek (040505)/
	Yellow Water River (040504)
Lake Pontchartrain	Abita River/Bogue Falaya River (040804)
Red	Flat River (100406)
Calcasieu	Marsh Bayou (030603)
Barataria	Bayou Segnette (020701)
Sabine	Vinton Waterway (110601)
Red	Cane River (101101)
Red	Lake Bistineau (100502)
Mermentau	Bayou Lacassine (050601)
Mermentau	Bayou Nezpique (050301)

# Implementation and Improvement

Watershed Implementation Plans follow Nine Key Elements in order to provide assessment and management information for a selected watershed. The Nine Key Elements are:

1. Identify the causes and sources of nonpoint pollution
2. Estimate the load reductions needed
3. Describe the management measures needed
4. Describe the technical and financial assistance needed
5. Develop a strategy to provide information and education
6. Develop an implementation schedule
7. Identify interim milestones
8. Develop criteria to determine load reductions
9. Develop a plan to monitor effectiveness

The incremental component of the Section 319 grant is utilized for implementing BMPs in watersheds where TMDLs and Watershed Implementation Plans have been completed. These Watershed Implementation Plans are the basis for implementing nonpoint source projects by both LDEQ and the Louisiana Department of Agriculture and Forestry's (LDAF) Office of Soil and Water Conservation.

## *Education and Outreach Activities*

The LDEQ NPS Staff have participated in educational and outreach activities in 2009 which has raised public awareness of nonpoint source pollution. The staff also attended conferences and classes to educate themselves, as well as giving presentations at workshops to educate others. The NPS staff has participated in activities such as:

- Launched Statewide Media Campaign
- Earth Day
- Envirothon
- Wild Woods Wanderings
- Hurst Wetland Watchers
- Ocean Commotion
- Hunting and Fishing Day
- World Water Monitoring Day
- Science, Technology, Engineering, and Math Camp for girls
- School Presentations
- Organizing Volunteer Storm Drain Marking Events
- Presenting BMP information to the Forestry Industry throughout the state
- Attending Stakeholder and Committee Meetings
- Attending Annual Nonpoint Source Conference
- Attending numerous other NPS related workshops, seminars, and conferences



Because storm drains flow directly to our lakes, rivers, and bayous and not to wastewater treatment plants, storm drain marking is an essential element of the state's stormwater pollution prevention program. Rainwater picks up street litter, yard waste, lawn fertilizers, pesticides, pet waste, and oils and fluids from driveways and streets. The first inch of runoff from a storm generally carries ninety percent of the pollution and causes at least half of water quality problems. The storm drain marking program is a hands-on project for volunteers who

# Implementation and Improvement

are interested in educating the public about nonpoint source pollution prevention. The markers are placed on storm drain inlets and intend to remind citizens to help protect our waters from pollution that can be harmful to fish and wildlife and increase weed and algae growth. Even the best plan for managing watersheds and controlling nonpoint source pollution cannot succeed without community participation and cooperation. An aggressive public outreach and education program, therefore, is essential for local communities to develop and maintain. Education and outreach strategies and ideas would raise the community's consciousness about the importance of water quality and the watersheds draining to our ponds, lakes, rivers, bayous, and eventually the Gulf of Mexico.



## Improvements shown in 2008 Integrated Report

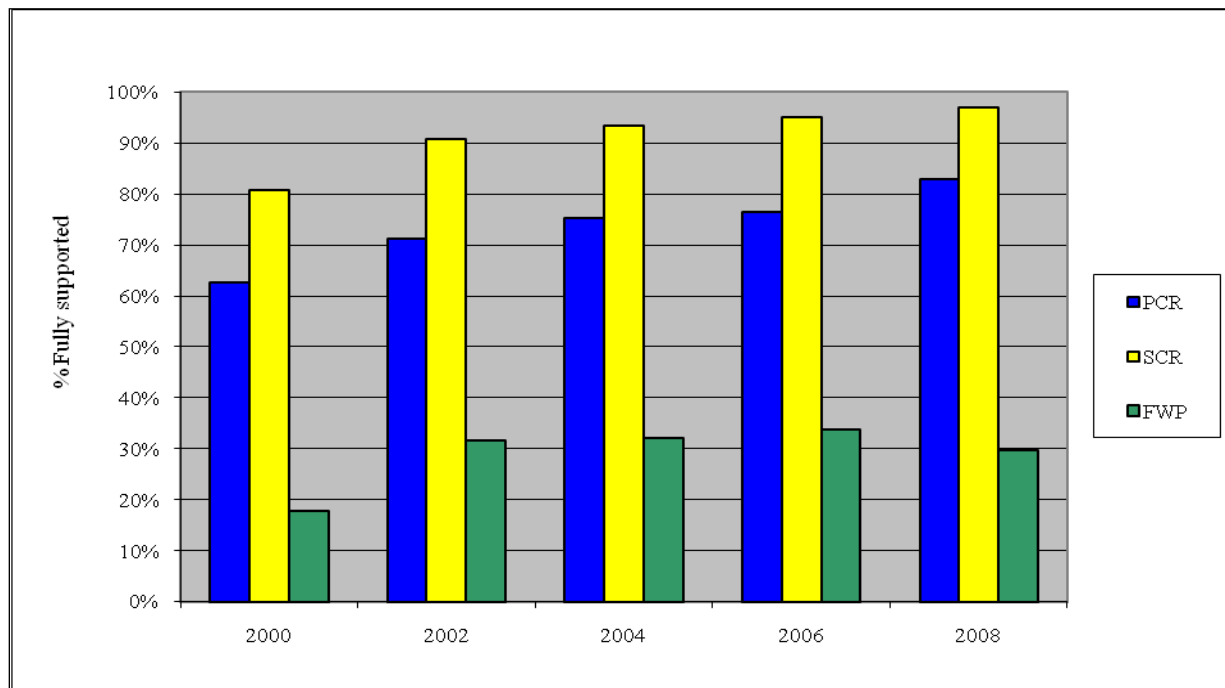
During 2008, LDEQ compiled the 2008 Integrated Report (IR), which provides information on the level of attainment of all of the water bodies within the state, based on water quality data from 2000 to 2007. The Integrated Report is written once every two years. The 2008 Integrated Report was not finalized as of the end of 2008. The data in the 2006 Integrated Report indicated that water quality had improved (i.e., one or more causes of impairment had been removed) in 80 water bodies across the state between the 2004 and 2006 listing cycle (Table 8). The 2008 IR indicated that 129 water bodies had improved since 2006 with one or more causes of impairment removed. The NPS staff are currently working on the 2010 IR for submittal to USEPA.

River Basin	Number of Water Bodies Improved in 2006 IR	Number of Water Bodies Improved in 2008 IR	Reason for Improvement
Atchafalaya (01)	3	2	New data shows attainment
Barataria (02)	10	9	New data shows attainment
Calcasieu (03)	8	6	New data shows attainment
Pontchartrain (04)	2	29	Data shows attainment
Mermentau (05)		8	
Vermilion-Teche (06)	2	24	New data shows attainment
Mississippi River (07)	0	1	New data shows attainment
Ouachita River (08)	36	8	New data shows attainment
Pearl River (09)	0	7	New data shows attainment
Red River (10)	6	16	New data shows attainment
Sabine River (11)		7	
Terrebonne (12)	13	12	New data shows attainment
<b>Total</b>	<b>80</b>	<b>129</b>	



# Implementation and Improvement

The 2008 IR indicated that there had been water quality improvements made in the number of water bodies that met their primary contact and secondary contact recreation uses. The graph below illustrates that as the blue and yellow bars continue to climb toward full attainment. More details on this use are included in the NPS Annual Report. The green bars illustrate the percentage of water bodies in full compliance with the fish and wildlife propagation use. LDEQ anticipates more success stories in 2010, based on the water quality data that has been collected for the 2009 IR.



# Implementation and Improvement

Although there have been significant water quality improvements made in the state's water bodies, LDEQ felt that in order to continue to make progress that it was necessary to work with local watershed coordinators and stakeholders. Therefore significant work has been done during 2009 to establish these coordinators and work with them to initiate watershed protection and restoration programs in their respective parts of the state. Local task force meetings were held, projects are being implemented, and a lot of education for the public on what needs to be done to improve water quality. A brief overview of their activities during this year has been included here in the NPS Annual Report.

## Organizing Watershed Coordinators

During 2009, LDEQ's NPS Unit continued to work with all seven Resource Conservation & Development Councils in Louisiana, as well as the Lake Pontchartrain Basin Foundation, to establish cooperative agreements for local Watershed Coordinators. These Watershed Coordinators worked to organize local stakeholder groups which worked on nonpoint source water quality problems in each of their respective areas. Local watershed groups will be the focus for much of the ongoing work related to controlling nonpoint source pollution within Louisiana. Watershed coordinators attended training in Bandera, TX, as well as, the National NPS Monitoring conference in efforts to educate and familiarize themselves with watershed planning and the many facets of NPS around the nation. The LDEQ, by request of the watershed coordinators, implemented monthly coordination meetings to allow an opportunity for information exchange and problem resolution for our state.



# *Implementation and Improvement*

## ***Improving Water Quality through an Integrated Watershed Approach in the Lake Pontchartrain, Terrebonne, Pearl, and Mississippi Basins***

The Ponchatoula Creek and Yellow Water River Watershed Protection Plan efforts were kicked off on April 20, 2009 by Capital RC&D. For this project the mission is to connect the people who live and work in Tangipahoa Parish and surrounding areas with their watersheds. They strive to help their community to take responsibility for their impact on the watersheds through conservation, protection, restoration, and education. New contacts were developed such as Keep Hammond Beautiful and Tangi Clean. Catherine Eichhorn has been helping with litter clean-up. Research activities in the watershed included monitoring floatable pollution during high flow. Current stormwater BMPs were assessed in anticipation of a stormwater ordinance which went into effect on Oct. 1, 2009. Waste water infiltration and illegal bypasses were documented. They have also been involved with addressing LPDES permit gaps. A meeting was held with the parish president- Gordon Burgess to discuss issues within Ponchatoula Creek and Yellow Water River. On Oct. 13, 2009 the watershed protection plan was introduced to Tangipahoa Parish Council. The watershed education kickoff at Global Wildlife Center began on Oct. 23, 2009.



## ***Improving Water Quality through an Integrated Watershed Approach in the Mermentau and Calcasieu Basins***

The Louisiana Department of Environmental Quality (LDEQ) needed a Watershed Coordinator to facilitate and conduct activities in watersheds in the Mermentau and Calcasieu Basins for the purpose of reducing nonpoint pollution sources to ultimately improve surface water quality and restore support for Clean Water Act designated uses of primary contact and fish and wildlife propagation. The intent of the project is to reduce surface water impairments by developing and implementing watershed-based activities deemed essential for surface water improvements. Scrutiny of available information indicates that both point and nonpoint sources contribute to surface water impairments. Coordination of watershed activities conducted within and outside LDEQ authorities is needed to efficiently discover and mitigate sources of impairment.



# *Implementation and Improvement*

At this time, the project is approximately 25% complete, with about 1600 hours worked. To date, the watershed coordinator has attended numerous public outreach meetings focusing on education and stakeholder building. The watershed coordinator meets with potential stakeholders and participates in stakeholder events in an effort to bring additional partners into this project. Many stakeholders have been added and they are very optimistic that additional partners will continue to be added. Significant progress has been made on the watershed plan. All background information has been compiled and much of the statistical data has been obtained. A preliminary draft of the implementation plan for this watershed has been started and progress will continue as information is received.

The following tasks/milestones have been accomplished as of 9/30/09: 1) Attended Texas Watershed Planning Short Course in Bandera, Texas. (August 2009), 2) Held a meeting with city council members, drainage board members and local landowners about NPS pollution and the watershed implementation plan for the Vinton Waterway. (September 10, 2009), 3) Made a presentation to the Gulf Coast Soil and Water Conservation Board. (September 11, 2009), 4) Assisted the Louisiana Coastal Coalition in a planting project. This group has been added as a stakeholder and has agreed to help in future planting projects in the watershed area. (September 19, 2009), 5) Assisted in the installation of BMP practices for erosion control of drainage ditch and livestock exclusion fence in the Vinton Waterway watershed. (September 22, 2009), 6) Held watershed demo/info session at local library for preteens and received write-up in local paper, and 7) Created a nonpoint source pollution info brochure to hand out and a power point presentation.





# *Implementation and Improvement*

## ***Improving Water Quality through an Integrated Approach in the Lake Pontchartrain and Pearl River Basins***

In this project, the Lake Pontchartrain Basin Foundation has been tasked with facilitating and conducting activities in the previously mentioned basins for the goal of reducing nonpoint pollution sources to ultimately improve surface water quality and restore support for the Clean Water Act designated uses of primary contact recreation and fish and wildlife propagation.

The Lake Pontchartrain Basin Foundation (LPBF) has established a task force in St. Tammany Parish to work on the watershed implementation plan for selected watersheds in their area basins. The task force meets monthly to discuss water quality and other environmental issues in these watersheds.

In developing the watershed implementation plan, the LPBF gathers data, reviews reports and creates maps. The LPBF is also involved in education and outreach activities. Additionally, the watershed coordinator has attended the Texas Watershed Planning Short Course, the Nonpoint Source Monitoring Conference, LDEQ's project review meeting, as well as monthly watershed coordinator meetings with LDEQ.

## ***Improving Water Quality through an Integrated Approach in the Red River, Sabine, Upper Calcasieu and Upper Vermilion-Tech River Basins***

In this project, the Twin Valley RC&D has been tasked with facilitating and conducting activities in the previously mentioned basins for the goal of reducing nonpoint pollution sources to ultimately improve surface water quality and restore support for the Clean Water Act designated uses of primary contact recreation and fish and wildlife propagation. Twin Valley RC&D has worked on and/or completed the following tasks to date: Developed field contacts, identified a targeted watershed, watershed planning, specified impacting activities, researched chemical data, identified sources of nonpoint source pollution, developed education materials.

Additionally the watershed coordinator has attended the Texas Watershed Planning Short Course, the Nonpoint Source Monitoring Conference, LDEQ's project review meeting, as well as monthly watershed coordinator meetings with LDEQ.

## ***Improving Water Quality through an Integrated Watershed approach in the Red River and Ouachita Basins***

The overall project goal is the reduction of the nutrient load into Lake Bistineau and the subsequent decrease in the amount of noxious aquatic plants. Trailblazer RC&D hired a Watershed Coordinator to achieve this, and the coordinator accomplished a number of planning and outreach activities: meetings with and presentations to representatives of state agencies and other groups, creation of educational materials for water quality, and study of water quality-related literature. The initial Watershed Coordinator resigned this year and a new coordinator was hired, and the project is currently active.

## ***Improving Water Quality through an Integrated Watershed Approach in the Lake Pontchartrain, Terrebonne and Barataria Basins***

The Bayou Land Resource Conservation & Development (RC&D) Council initiated this project in June of 2008, by hiring a Watershed Coordinator to facilitate and conduct activities within the Lake Pontchartrain, Terrebonne and Barataria Basins for the goal of reducing non-point source

# *Implementation and Improvement*

pollution sources to ultimately improve water quality and restore support for the Clean Water Act designated uses of primary contact recreation and fish and wildlife propagation. The Watershed Coordinator (Jennifer Roberts) has been working on gathering data and information on Bayou Segnette to better characterize its water quality. She has also met with State Park Rangers, fishermen, community members, researchers and storm water managers in a number of small meetings and boat trips in order to build an informed stakeholder base.

Louisiana has 12 river basins that it manages through water quality data collection, stream surveys, TMDL development and Watershed Implementation Planning and implementation. The following sections highlight the projects that have been implemented in Louisiana's River Basins during 2009.



## ***Improving Water Quality through an Integrated Watershed Approach in the Mermentau and Vermilion Teche Basins***

The Louisiana Department of Environmental Quality (LDEQ) requires the services of a full time Watershed Coordinator to facilitate and conduct activities in the selected watersheds or groups of watersheds in the Mermentau and Vermilion Teche Basins for the purpose of reducing non-point pollution sources to ultimately improve surface water quality and restore support for Clean Water Act designated uses of primary contact and fish and wildlife propagation.

The objective of the watershed coordinator is to facilitate and conduct activities within the Mermentau and Vermilion Teche Basins for the goal of reducing nonpoint source pollution sources to ultimately improve water quality and restore support for the Clean Water Act designated uses of primary contact recreation and fish and wildlife propagation. Thus reducing the number of watersheds listed as impaired on the Louisiana Water Quality Integrated Report (303d) list.

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During 2009, the watershed coordinator chose the Bayou Teche watershed as the area where the watershed planning efforts will be focused. The watershed coordinator has gathered various partners to join in the planning efforts. Mayors, parish presidents, parish governments, Kiwanis Club, SWCD's, BVD, recreationists, and the TECHE Project are just a few that have been made aware of the efforts that will be needed in order to reduce the nonpoint source pollution in the area. Some of these groups, along with other partners, have come together to create a task force that will address the problems in the area. The gathering of data and the revision of the watershed plan for the area are in place as well. There has been an organized trash pick-up on the Teche, as well as an MS4 workshop to help educate the community. This project will continue to bring education to the homeowners and municipalities in the area on how to reduce the nonpoint source pollution. The watershed coordinator is continually meeting with new stakeholders to see what can be done to help out in this process.

## ***Improving Water Quality Through An Integrated Approach In The Ouachita River Basin***

Delta RC&D selected the Bayou Macon Sub-Watershed for development of a watershed protection plan. This selection was made in partnership with LDEQ and other stakeholder groups. The following stakeholders were contacted: LDEQ, USEPA, USDA-NRCS, USDA-ARS, The Nature Conservancy, Northeast Delta RC&D, Louisiana Cooperative Extension Service, LSU Ag-Center, University of Louisiana-Monroe, La. Department of Agriculture and Forestry, Ducks Unlimited, and local Soil and Water Conservation Districts.

Northeast Delta RC&D hosted a Bayou Macon stakeholder meeting on April 15, 2009. The group began to locate existing resource data needed to create a watershed inventory and began to identify gaps in resource data needed to create the watershed protection plan. Northeast Delta RC&D also co-hosted five landowner meetings in the Ouachita Watershed with NRCS and the local Soil and Water Conservation Districts (SWCD). These meetings allowed landowners and land users to identify natural resource concerns in their local SWCD's. This information will be compiled and prioritized by NRCS. Mike Adcock met with Dr. Timothy Appleboom, USDA-ARS Soil and Water Research Unit, and Dr. Appleboom discussed his water



# *Implementation and Improvement*

quality sampling project with the District. Dr. Appleboom's water quality sampling project is comparing nitrogen runoff trends on different tillage systems on agricultural lands.

In addition, Northeast Delta RC&D donated 7,000 hardwood seedlings to Avoyelles Parish Wildlife Federation. These seedlings will be used as environmental / ecological educational tools. This non-profit group works with local high school students teaching about carbon sequestration, developing wildlife habitats, and wetland restoration and water quality issues. Northeast Delta RC&D met with the RC&D Full Council Members and discussed the Bayou Macon Watershed Protection Plan. The RC&D Council is comprised of landowners, land users, and other concerned citizens in the area.

The Soil and Water Conservation District's Board of Supervisors agreed to identify resource concerns in the watershed and to forward them to the RC&D Area Office. Resource concerns identified by the Board of Supervisors from those parishes were:

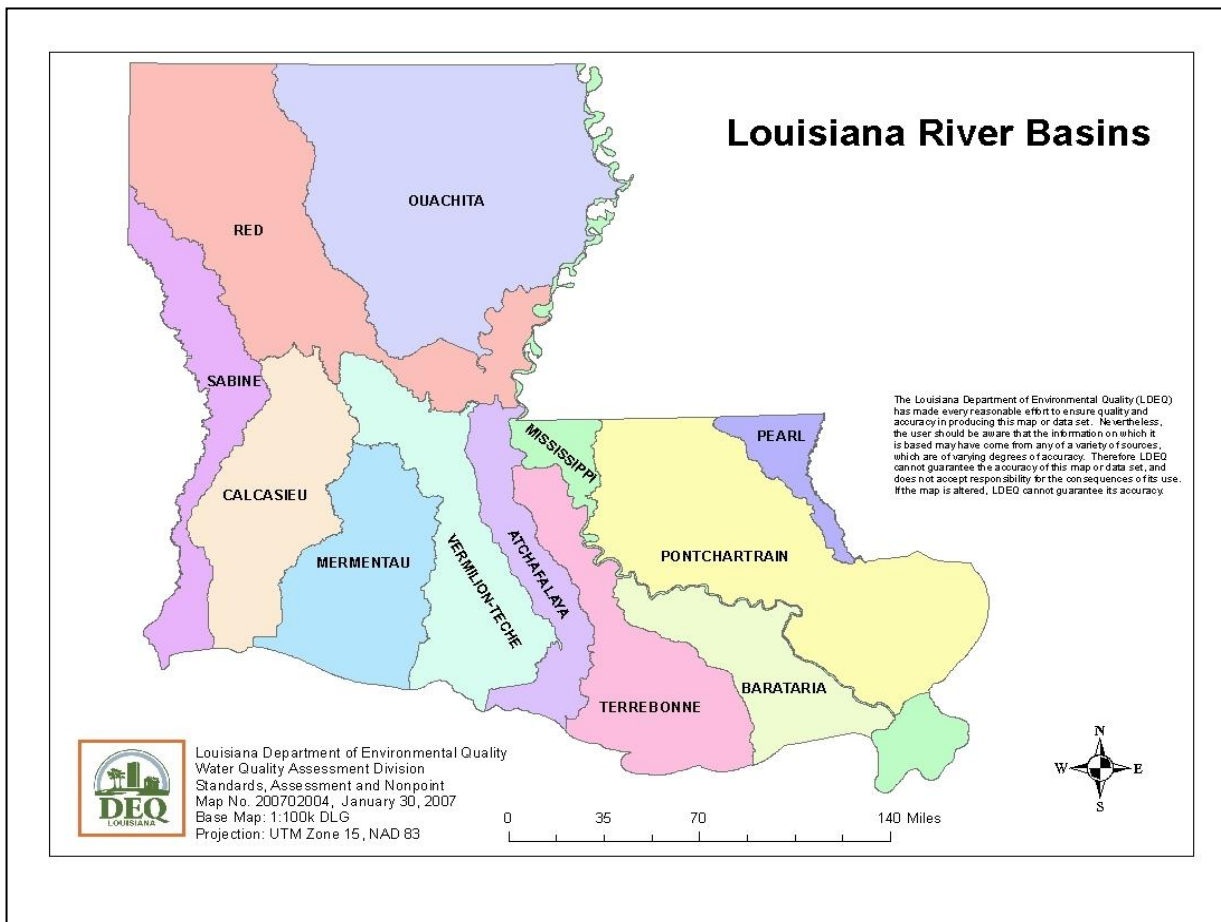
1. Lack of maintenance on the channels that drain into the Bayou. The Police Jury has jurisdiction over the maintenance of these channels. The Police Jury cannot maintain these channels due to lack of funding. Sediment and debris cause flooding which washes out nutrients and starts sheet-flow erosion problems.
2. After Bayou Macon was drained (1963), numerous oxbows or cut-offs were formed. Many fields drain into these cut-offs and then to the Bayou. Washouts are occurring at the outlets of the cut-offs allowing sediment to enter the Bayou.
3. Nuisance aquatic vegetation is stopping up the outlets of the cut-offs. This concern reduces recreational opportunities (fishing, frog and duck hunting).
4. Severe erosion along the banks of the Bayou.

Northeast Delta RC&D co-hosted a Limited Resource / Minority Farmer and Cattleman Workshop in the Bayou Macon Watershed. The District completed the Bayou Macon Visual Reconnaissance Trip. During the summer of 2009, Northeast Delta RC&D with assistance from the LDEQ staff completed a 140 mile visual reconnaissance trip on Bayou Macon. This trip originated at the Arkansas / Louisiana state line and ended at the Tensas River. The purpose of this trip was to provide a basic level of Bayou Macon's health. This trip is the first level of assessment and is based on visual observations of the physical conditions of the bayou. The use of more detailed assessments (water quality monitoring, watershed modeling, flow and load duration curve data, etc.) will be necessary to fully address the 9 elements of watershed planning. During the reconnaissance trip, RC&D personnel identified potential problem sites that may be contributing to the water quality problems in the Bayou. Assessments were made at the end of every mile traveled and between each mile if a potential problem site was identified. Potential problem sites identified include streambank erosion, sedimentation/siltation, bank sloughing, gully erosion, point source locations, livestock along the bayou, trash/debris, weirs, quality of bank vegetation or lack of, and agronomic practices (farming to the edge, no buffers, etc.). Photographs were taken at each assessment site and located using GPS coordinates. 226 visual assessments were conducted and 650+ photographs taken. This data will be used in the watershed planning and educational process. A stakeholder boat trip and picnic is planned for the fall of 2009.



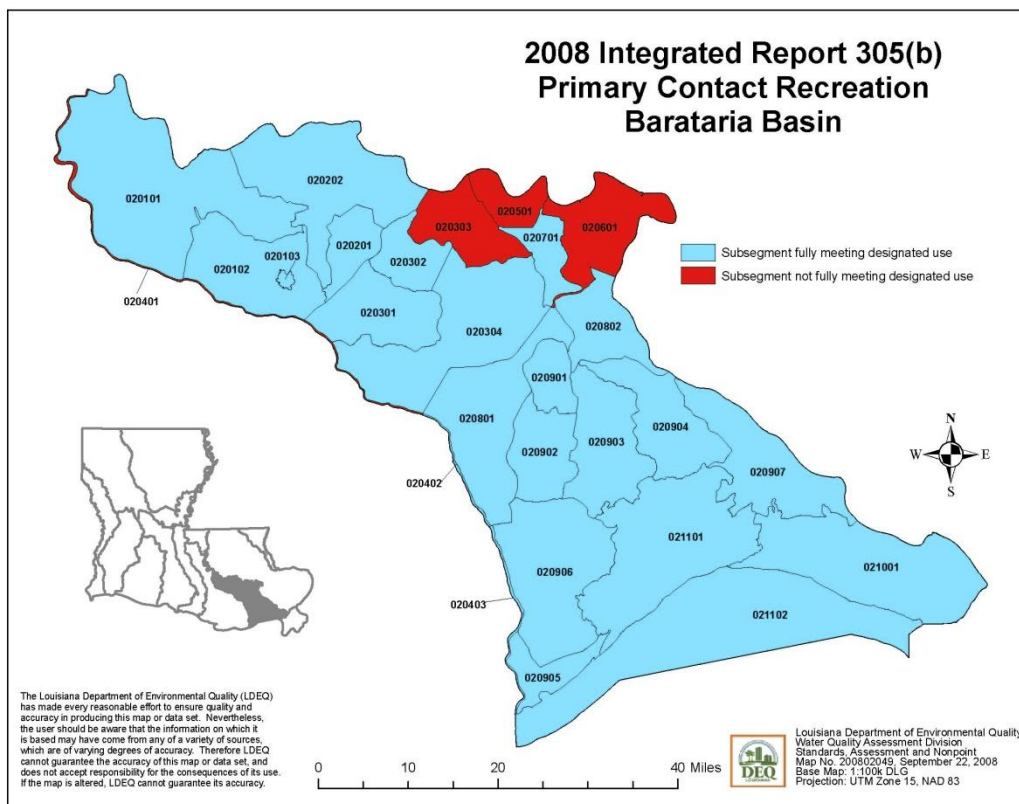
# Implementation and Improvement

Northeast Delta RC&D worked with USDA-NRCS, LDEQ, ULM, and other members of the Louisiana State Technical Committee on the Mississippi River Basin Healthy Watershed Initiative (MRBI). This Initiative will provide approximately \$320 million in USDA financial assistance over the next four years to implement voluntary conservation practices that address water quality problems in priority watersheds. The District works with Dr. Kevin Baer (ULM), Mr. Max Forbes (LDEQ), and other watershed protection partners to develop a water quality monitoring strategy within the targeted watersheds. Water quality data collected will be used to identify sources of impairment and to develop land management options to address the sources identified. Other activities within the past reporting quarter included development of a power point presentation describing the watershed protection efforts in the project area; attended the LDEQ Annual Section 319 Project Review Meeting held on November 18-19 at the LDEQ Headquarters in Baton Rouge, LA; made a presentation and discussed the progress made on the project; hosted a watershed tour in the Tensas Watershed for LDEQ NPS Program employees; attended a watershed coordinator's meeting in Woodworth, LA; and met with stakeholders in the Brushy Bayou / Walnut Round-A-Way Watershed. Northeast Delta RC&D and the watershed protection partners are developing a watershed protection plan for this watershed.



# Implementation and Improvement

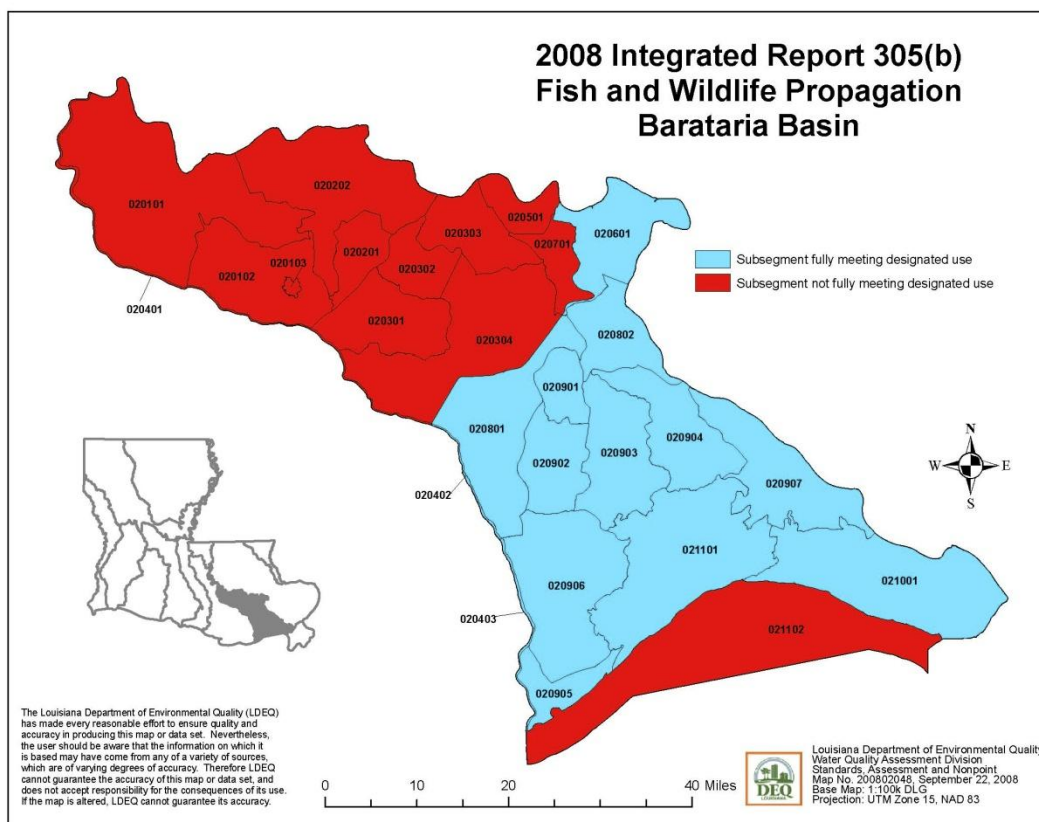
## Barataria Basin



The 2008 IR indicated that there were three subsegments that were not fully meeting the Primary Contact Recreation use within the Barataria Basin, compared to two in 2006. The additional subsegment was in the upper part of the basin. Lake Cataouatche was added as an impaired waterbody for Primary Contact Recreation because it was not meeting the criteria for fecal coliform. The impaired subsegments for Fish and Wildlife Propagation remained the same from 2006 to 2008 in the Barataria Basin.



# Implementation and Improvement



The water quality data for Bayou Lafourche indicated an increase in the dissolved oxygen concentration from 2008 and a measurable decline in fecal coliform bacteria between 2008 and 2009.

Average Fecal Coliform Concentrations Measured in Cells per 100 mL Sample for Selected Water Bodies in the Barataria Basin							
Water Body (subsegment)	2000	2004	2005	2006	2007	2008	2009
Bayou Lafourche (020401)	127	357	323	265	796	463*	198
*partial year data							

Average Dissolved Oxygen Concentrations Measured in mg/L for Selected Water Bodies in the Barataria Basin							
Water Body (subsegment)	2000	2004	2005	2006	2007	2008	2009
Bayou Lafourche (020401)	5.70	6.94	6.66	6.71	6.38	6.68*	7.78
*partial year data							

## USDA Programs

During FY 2009, the USDA implemented approximately 3,199 acres of BMPs within the Barataria Basin through the EQIP.

Since many of the remaining water quality problems in the Barataria Basin are related to nonpoint source loads of sediment and nutrients from the watersheds in the upper portion of

# *Implementation and Improvement*

the basin, LDEQ continues to look into options of how to manage those problems. Past work has looked at sugarcane BMPs to reduce the nonpoint source loads entering the bayous, but introduction of these sediments and nutrients into the adjacent wetlands may be a better way to manage the watershed. Therefore this project was selected to gather data on the effectiveness of this type of management approach that could be applied to many watersheds in both the Barataria and Terrebonne Basins.

## ***Water Quality Modeling to Support the Use of Natural Wetlands to Treat Nonpoint Source Pollution as a Restoration Goal for the Barataria Basin***

The Louisiana Department of Environmental Quality (LDEQ) completed the total maximum daily loads (TMDLs) for the Barataria Basin in 2003. The TMDL for Bayou Boeuf, Halpin Canal, Theriot Canal (020102) and Lake Boeuf (020103) indicated that in order to meet the water quality standard for dissolved oxygen, NPS pollutants need to be reduced by 100% in the summer months and 92% in the winter months. The model also indicated that natural background loads would need to be reduced by 37% during the summer months. The no-load scenario (i.e. no reductions in natural background loads) yielded minimum dissolved oxygen values of 3.5 mg/L for the summer months and 5.6 mg/L for winter months. The two predominant land use types in subsegment 020102 are wetland forests and agriculture, while the land use types in 020103 are mostly fresh marsh and open water.

It may not be possible to achieve the nonpoint source load reduction that the TMDL indicated would be necessary for subsegments 020102 and 020103 to meet their water quality standard for fish and wildlife propagation. The traditional approach for this problem would be to work with the sugarcane farmers to implement the types of best management practices that would reduce sediment, nutrients and organic material entering the water bodies. Since these watersheds exist within the same areas where coastal restoration projects are planned for diverting water from the Mississippi River to introduce more sediments and nutrients into the marshes and wetlands, all of these factors need to be considered when managing these types of watersheds.

This project proposes to provide information to assist the State in understanding how the nonpoint source goals and the coastal restoration goals will be met in waters impaired by nonpoint source pollutants. It may be beneficial for nonpoint source runoff from agricultural fields to be diverted into adjacent wetlands rather than into receiving water bodies. Doing so may improve wetland health while concurrently reducing impacts to receiving water bodies. Water quality modeling will provide data to show when and where nutrient reduction occurs, and thus support the State's decision making process by allowing many different management scenarios to be considered. Subsegments 020102 and 020103, referred to from here on as the 'Boeuf Basin', will be the pilot area to apply the watershed modeling and management tool that is applicable throughout the Coastal Restoration Area.

The goal of this project is to develop a modeling program that will illustrate whether in-stream water quality standards can be met with and/or without the input of Mississippi River water into the Bayou Boeuf, Halpin Canal, Theriot Canal and Lake Boeuf. The outputs will also provide information on whether wetlands in the Barataria Basin will benefit from the introduction of nonpoint source loads from the sugarcane fields.



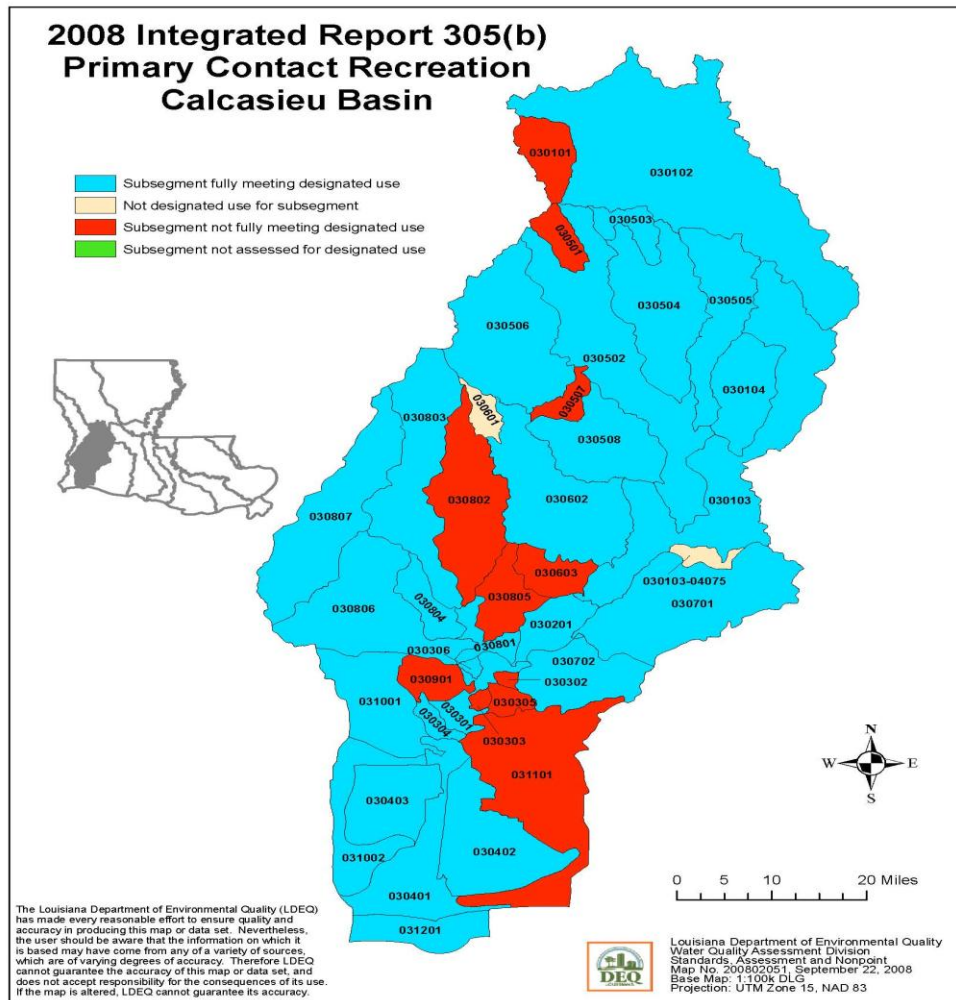
# *Implementation and Improvement*

During 2009, the QAPP was approved. Twelve open water sites, two forested and two emergent wetland sites were selected for the collection. An extensive literature review was carried out that encompassed all ecological scientific literature concerning the Boeuf Basin, documents relating to land use practices, and available satellite and aerial imagery. As a result of the extensive research and calculations, “subwatersheds” were formed that would likely be areas that waters may be diverted. Water quality sampling at the selected sites and analysis has been taking place on a monthly basis, except for the months where the rain events were nonexistent. Soil cores were taken from forested and emergent wetlands for denitrification and nitrogen addition experiments. Currently, a hydrological bathymetric survey is being carried out in the most westward “subwatershed” of Boeuf basin. Water level recorders have been deployed at 7 locations in the Boeuf Basin to be used in further analysis as the project continues to move forward.



# Implementation and Improvement

## Calcasieu Basin



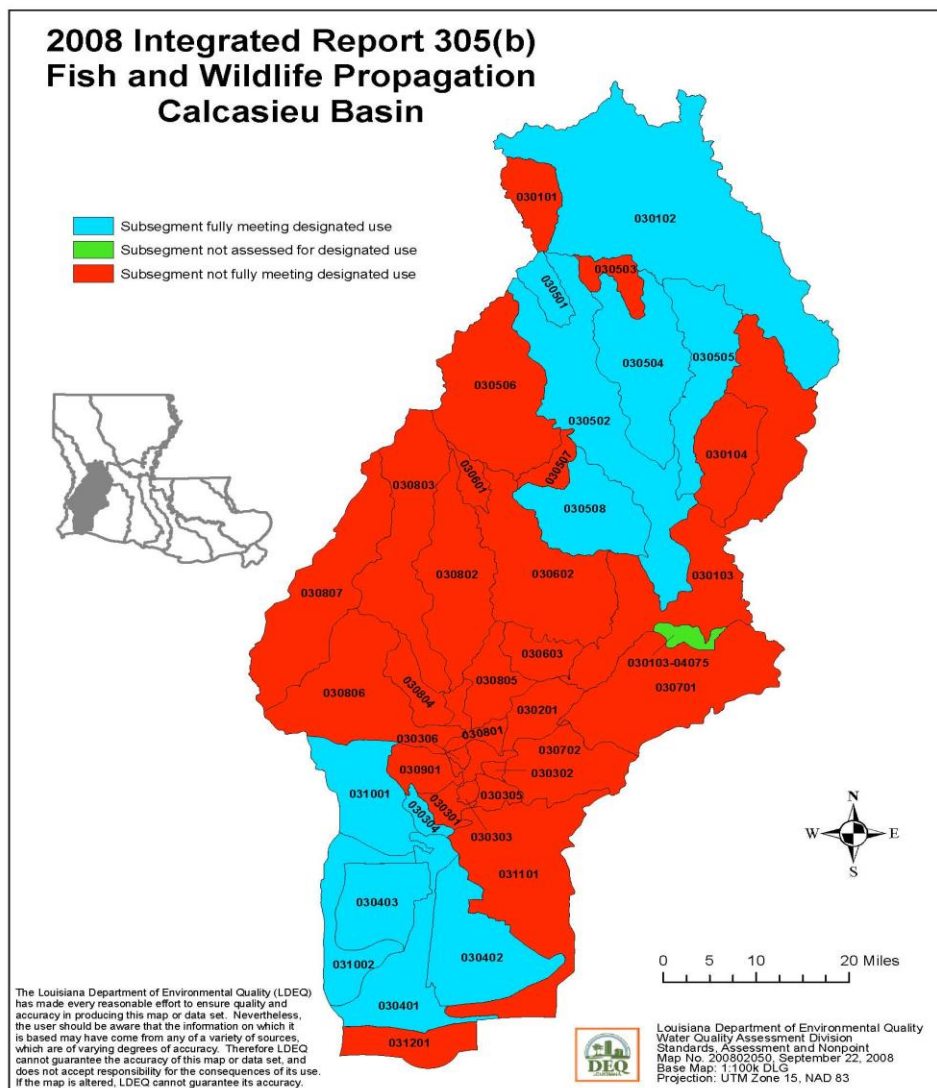
The 2008 IR indicated that there were eleven subsegments that were not fully meeting the primary contact recreational use standard within the Calcasieu River Basin, compared to eight in 2006. Several subsegments were added and removed throughout the basin with an overall gain of three impaired subsegments.

For Fish and Wildlife Propagation, twelve subsegments were meeting the criteria in the 2008 IR, compared to eleven in the 2006 IR. Bundicks Creek and Bayou Choupique were removed from the draft 2008 IR. However, Prien Lake was added to the list of impaired waterbodies for low dissolved oxygen.

### USDA and SWCD Programs

During FY 2009, the USDA implemented approximately 11,950 acres of BMPs within the Calcasieu River Basin through the EQIP. An additional 60 acres of practices were implemented through the Conservation Reserve Program (CRP), 0 acres of practices were implemented through the Wetlands Reserve Program (WRP), and 1,161 acres of practices were implemented through the WHIP.

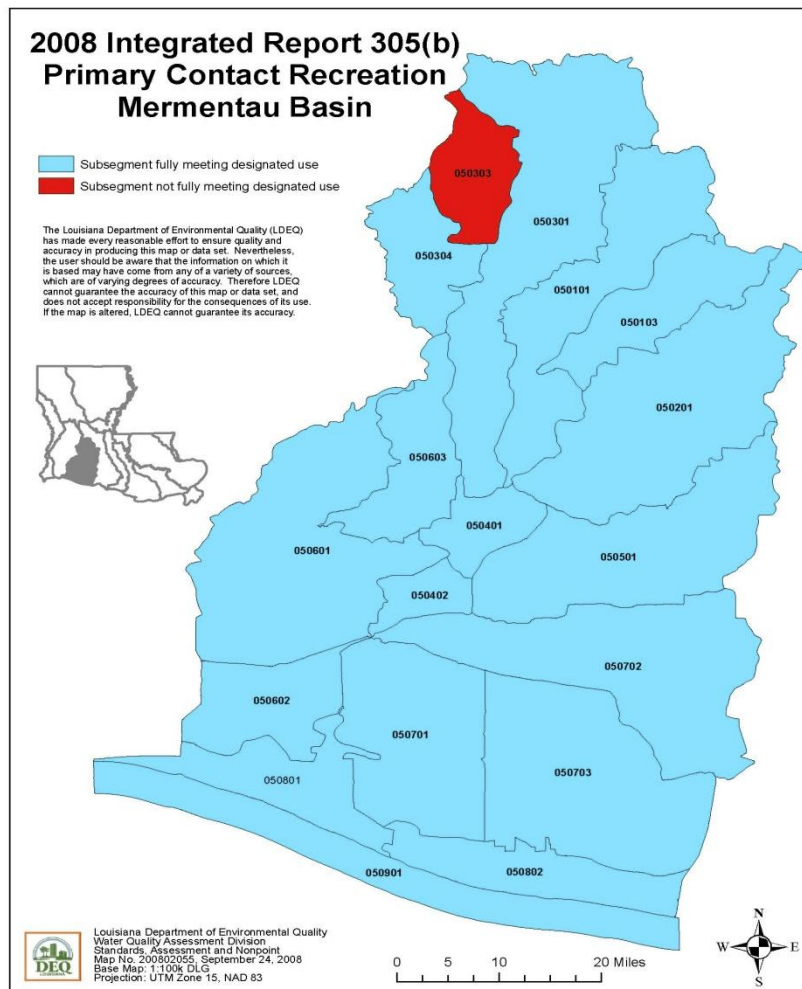
# Implementation and Improvement



There is a watershed coordinator working in the Calcasieu River Basin and there is an incremental Section 319 project there also, but no base funds have been spent on a project there other than funding the watershed coordinator during 2009. There is a project proposed in the 2009 Section 319 work plan to address some of the home sewage issues that exist and contribute to water bodies included on the state's 303(d) list.

# Implementation and Improvement

## Mermentau River Basin

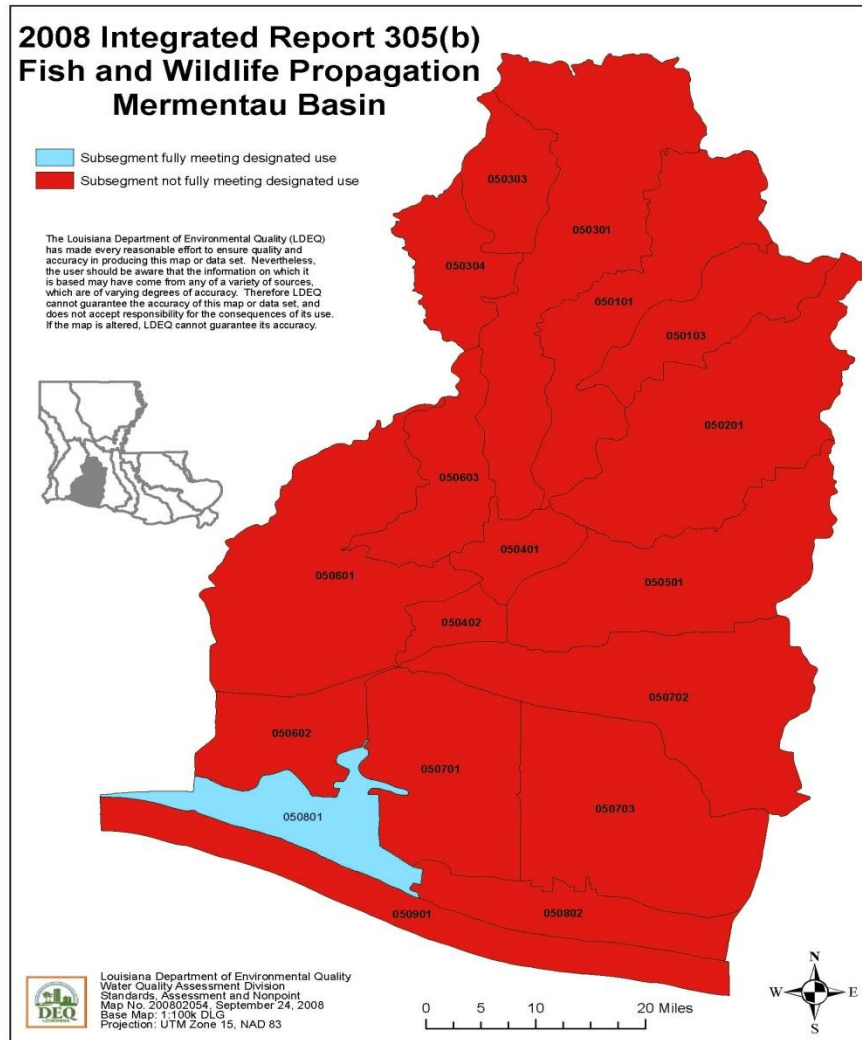


The 2008 IR indicated that four of the watersheds that were listed as impaired in the 2006 IR are now fully meeting their primary and secondary contact recreation uses, which leaves only one watershed listed as impaired for this use within the Mermentau River Basin. The water quality improvements were made in Bayou Nezpique, Bayou des Cannes, Bayou Mallet and Bayou Plaquemine Brule. Castor Creek is still not meeting the primary contact recreation use due to high levels of fecal coliform.

The 2008 IR indicates that the water bodies in the Mermentau River Basin have remained consistent since 2006, with only one water body fully meeting the standard for fish and wildlife propagation use. The Mermantua River from Catfish Point Control Structure to the Gulf of Mexico is an estuarine water and fully supports its uses.



# Implementation and Improvement



Average Dissolved Oxygen Concentrations Measured in mg/L for Selected Water Bodies in the Mermentau River Basin								
Water Body (subsegment)	1997	1998	2003	2004	2006	2007	2008	2009
Mermentau River (050401)	3.24	3.63	3.43	4.1	3.65	2.62	3.91*	4.04
*partial year data								

LDEQ collects monthly water quality data each year for the Mermentau River, but samples the other water bodies on a 4-year cycle. The water quality data from 2009 for the Mermentau River indicated that it continued to improve, with the dissolved oxygen concentration averaging 4.04 mg/L but the fecal coliform concentration increased with the annual average of 405 cells per 100 ml sample. There was one large value in July that affected the annual average but this value did fall within the swimming season.

# Implementation and Improvement

Average Fecal Coliform Concentrations Measured in Cells per 100 mL Sample for Selected Water Bodies in the Mermentau River Basin								
Water Body (subsegment)	1997	1998	2003	2004	2006	2007	2008	2009
Mermentau River (050401)	368	467	4530	474	82	124	116*	405
*partial year data								

LDEQ continues to work in the Mermentau River Basin on projects related to implementing agricultural BMPs and gathering loading data on their effectiveness. The results of these data will be included in the watershed implementation plans that are being revised and written for the watersheds in this basin.

## *Modeling Nonpoint Source Pollution and Land Use Types in Bayou Plaquemine Brule Watershed*

This project is scheduled to be completed in 2010. The Bayou Plaquemine Brule waterbody in the Mermentau River Basin in southwestern Louisiana is listed as impaired due to organic enrichment or low dissolved oxygen and is not meeting its designated use for fish and wildlife propagation. The specific goal of this project is to quantify the nonpoint source loads from land use types that exist in the Bayou Plaquemine Brule watershed. Spatial and temporal variation of nonpoint source pollutant sources and loading are being measured. The specific objectives are to quantify the daily loading of suspended solids and nutrients for Bayou Plaquemine Brule and its tributaries and to quantify the contribution of land use types such as soybeans, sugarcane, and rice pastures on nonpoint source pollution in Bayou Plaquemine Brule. It will also evaluate the various BMPs implemented and their effects on nonpoint source pollution in the watershed. Finally, it will establish baseline information to quantify the effectiveness of best management practices in reducing pollution loads.

The 3-year surface water quality dataset that the University of Louisiana-Lafayette will have at the end of the project will allow LDEQ to identify target areas in the watershed where BMPs need to be implemented to improve water quality and to also track whether the ongoing BMP implementation has been effective in reducing NPS pollutant loads and improving water quality.

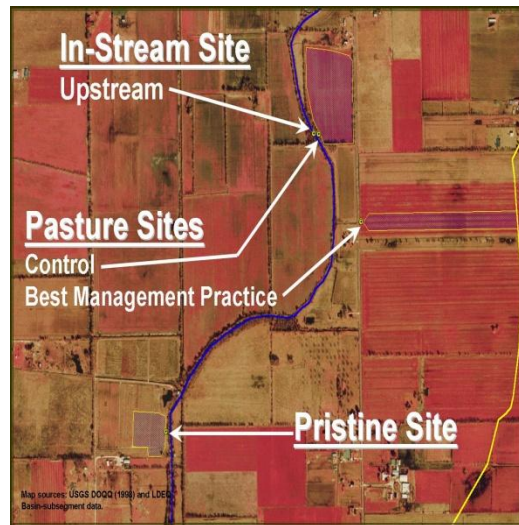


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During 2009, SWAT (Soil Water Assessment Tool) model calibration and validation was completed using the collected data and the available flow data within the watershed. A sensitivity analysis was conducted and identified eight sensitive parameters in SWAT modeling for the watershed. Annual loading rates have been computed for nutrients using SWAT model for one of the sub-watersheds. The TSS, nitrate and SRP “hotspots” in the watershed have been identified, but require more statistical analyses to detect trends on spatial and temporal variations in water quality in the watershed. This process is currently taking place.

## ***Bayou Wikoff Sub-Watershed of Bayou Plaquemine Brule Watershed Project***

LDEQ and LSU Ag Center have been working on data collection for the Bayou Wikoff Sub-Watershed. The Bayou Wikoff Sub-Watershed is representative of the type of land-use that exists within the upper portion of the Bayou Plaquemine Brule watershed. The major land-use type is agricultural production, specifically sugarcane and pastures. Through the implementation of this project, LDEQ should be able to determine whether the BMPs implemented for these two types of agricultural production will achieve sufficient nonpoint source load reduction to achieve water quality standards. However, additional data is needed to make this determination.



The project area is the Cole Gully Sub-Watershed which lies within the upper portion of the Bayou Plaquemine Brule. The Louisiana Department of Environmental Quality (LDEQ) selected the Bayou Plaquemine Brule watershed in South Louisiana to implement a watershed implementation project. This watershed project has been a site of intensive watershed level monitoring and BMP implementation. This intensive implementation process allows LDEQ to determine whether the best management practices being recommended for nonpoint source pollution reduction do in fact reduce the pollutant load to the water body by 30-50%. Since this is the load reduction that was calculated through the TMDL process necessary to achieve water quality standards for dissolved oxygen, LDEQ needs to determine if that goal is feasible with the currently recommended practices.

A total of seven monitoring sites have been identified for the project. The sites selected include a “control” or pristine site, pasture sites, and sugarcane sites. In addition, two in-stream locations - one above-stream from the edge-of-field locations and another downstream - were selected.

During 2009, water quality monitoring of all instrumented sites commenced as soon as the QAPP was approved. Rainfall and flow data were directly downloaded from the ISCO instruments of all seven sites to a Flowlink 4 database on a monthly basis. Unusually high rainfall amounts were recorded at the sites throughout 2009. No events were recorded during June and July, however. Comparison of the recorded amounts at the instrumented site with that at the Rice Experiment Station, Crowley as well as Grand Coteau shows excessive amounts



# Implementation and Improvement

in May and September months. Collected runoff and in-stream samples were transported to the Department the LSU Agricultural Center Laboratory within 24 hr of sampling for initial preparation prior to analyses. Following sample preparations, the prepared water samples were forwarded to the Department of Agricultural Chemistry Lab on the LSU campus where the following physical and chemical analyses were performed:

- Total solids (TS)
- Volatile solids (VS)
- Suspended solids (TSS)
- Total dissolved solids (TDS)
- Turbidity
- Total phosphorus (TP)
- Dissolved phosphorus (DP)
- Ammonia ( $\text{NH}_4$ ), nitrite ( $\text{NO}_2$ ), and nitrate ( $\text{NO}_3$ )
- Total Kjeldahl nitrogen. (TKN)
- Biological Oxygen Demand (BOD)
- pH
- EC



Sampling was carried out for a total of 23 events. Effluent samples from all seven sampling sites were analyzed by the Department of Agricultural Chemistry. The analyses have been completed for all but most recent sampling dates.

Results of water quality analysis for the runoff from the different management and in-stream sites have been tabulated. Major differences in concentrations of the various constituents for the different sites are currently being delineated.

## ***The Coulee Baton Microwatershed Nonpoint Source Pollution Monitoring and Modeling Project***

The Vermilion Soil and Water Conservation District (SWCD) became interested in a microwatershed project after attending an Industry-Led Solutions (ILS) meeting in New Orleans in August 2004. This was a meeting of agricultural industry leaders to discuss hypoxia in the Gulf of Mexico and the role of agriculture to help resolve the problem. Following the meeting, the Vermilion SWCD contacted the Texas Institute for Applied Environmental Research (TIAER) who developed an approach known as the Planned Intervention Microwatershed Approach (PIMA) which is a new model for addressing agricultural nonpoint source pollution. TIAER defines a microwatershed as an area within a watershed, incorporating anywhere from 3,000 to 20,000 acres, with identifiable hydrologic boundaries. According to TIAER, by dealing with small areas, project coordinators can reduce landuse variables and more readily identify pollutant load contributors.

The Vermilion SWCD partnered with other entities in the region to find a microwatershed that was diverse in topography, drainage, and landuse. The Coulee Baton Microwatershed was selected. This proposal is a part of the larger-scale Coulee Baton Microwatershed Plan for

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voluntary application of various conservation measures and Best Management Practices (BMPs) on the land by landowners and homeowners in addressing the water quality problems in the Coulee Baton Microwatershed area.

This project is intended to address nonpoint source pollution in the Coulee Baton Microwatershed where various conservation measures and BMPs will be applied by landowners and homeowners.

The objectives of this project include: (1) monitor field and laboratory surface water quality parameters for at least five locations in the Coulee Baton microwatershed; (2) quantify the contribution of land-use types such as agriculture, forestry, and residential areas on nonpoint source pollution in Coulee Baton microwatershed; (3) identify 'hot spots' for nonpoint source pollution in the microwatershed, and make the information available to the Vermilion Soil and Water Conservation District so that the producers implementing can begin using the voluntary conservation cost share programs available; (4) establish baseline information to quantify the effectiveness of best management practices in reducing pollution loads.



During 2009, the QAPP was approved and seven sites were selected to monitor throughout the Coulee Baton watershed. The cross-sections and instrumentation of each of the seven sites was also completed. Each site has a box installed to house a sampler and flow meter. Also, solar panels and rain gauges have been installed in all the seven sites. At the present time, weather data is being analyzed and landuse information is being collected and analyzed. This process will continue, as the project is in the beginning stages of monitoring.

## ***Coulee Baton Micro Watershed Rural Sewer System Improvement Project***

The Coulee Baton Microwatershed Rural Sewer Improvement Project was developed in response to a larger plan focusing on the Gulf of Mexico Hypoxic Zone using a microwatershed management strategy. Assessment within the watershed revealed that about 70% of the homes in the watershed were discharging undertreated sewerage into the drainage ways. A common misconception of the homeowner is that their system is functioning properly because they have never had a blockage or odor problem. However, all of the soils in the microwatershed have severe limitations with wetness and slow percolation which limits the use of absorption field lines. In addition to poor soils, over 90% of the homes in the micro watershed are more than 20 years old with inadequate secondary treatment. Rural communities with aged septic systems

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have shown to be a significant contributor to nonpoint source pollution. A failing septic system can discharge more than 75,000 gallons of untreated wastewater into ground and surface waters in a year.

Project tasks address many of the issues and concerns addressed in the Louisiana's Nonpoint Source Management Plan for 2000 in the Statewide Educational Programs – Home Sewage Systems Section.

1. Homeowner education (page 105) will be accomplished with field days, educational talks and town hall meetings.
2. Innovative Technologies (page 107) will be accomplished with the effluent reduction system demonstration.
3. Improving water quality (page 104) will be addressed through the cost share program to replace aged and failing septic systems.
4. Building partnerships with state and federal agencies and non-profits (page 108) will be promoted by the 12 cooperating state, federal and non profit organizations working with the Coulee Baton Micro Watershed.

A major limitation for the micro watershed is monetary assistance for homeowners with potentially failing rural sewage systems. The Acadiana Resource Conservation and Development Council, along with other partnering agencies, proposed to develop a three phase project that would: 1) demonstrate properly functioning effluent reduction systems, 2) provide a cost share component for replacement and repair of aged systems for homeowners, and 3) implement an educational and outreach program that will highlight proper maintenance of systems, and an explanation of how the systems work, in hopes the homeowners will make better decisions about system maintenance and replacement. Practical details and logistics of achieving deliverables were discussed and agreed upon in several meetings/consultations between LDEQ representatives, LDHH representatives, Natural Resources Conservation Service (NRCS) specialists, Vermilion SWCD employees and board members, and Acadiana RC&D Council members and staff.

The first stage of this project was a 60/40% cost-share. The total contract amount was for \$95,119, with \$56,587 being contributed from federal funds and \$38,532 being contributed from matching funds. In spite of early comprehensive outreach efforts and increased citizen awareness, the majority of homeowners were stymied by the cost of installing even the most basic new home septic system at the 60/40% cost-share level. In spite of the efforts to iterate program benefits for the watershed and for septic system owners, only four ER systems were installed within the first four (4) months of the cost-share phase, and one more was installed five months later. The 60/40% cost-share incentive was initially deemed unsuccessful, and at the request of DEQ project managers, a survey was conducted to determine the reason for low homeowner participation. An overwhelming majority of the respondents stated that they could not afford the 40% required and that they would be more inclined to participate if a higher percentage was offered.

LDEQ investigated the potential for increased funding. In anticipation of an amended contract, revisions were made to the original budget and deliverables, and a strategic timeline was devised to reintroduce the program at a higher cost-share percentage. Revisions were also made to all original letters and agreements for homeowners and contractors. In the months of contractual review, Acadiana RC&D promoted the program at various public settings – Earth



# *Implementation and Improvement*

Day events and civic club meetings. Vermilion SWCD continued to promote the program and offer assistance with the permitting process.

The second phase of the project amended the contract to a 90/10% cost-share, in which the homeowner would contribute only 10% of the necessary funds to install/repair the septic system, and LDEQ would contribute the remaining 90%. The total contract amount was amended to \$535,559, in which a federal contribution was made for \$455,873, and a match contribution of \$79,686 was added. Once the amended contract was received, partners attended the Vermilion Parish police jury meeting to ask for support in promoting the new 90/10% cost share opportunity. Advertisements began to announce the ninety percent cost share program and to encourage participation at another scheduled public meeting. Newspaper articles were printed and large maps and fact sheets were placed at public places in Kaplan and Abbeville. A door-to-door campaign to deliver revised homeowner packets was conducted throughout the watershed. (Approximately 150 homes were visited. An estimated 35 homes already have upgraded systems installed and are in compliance with current DHH regulations. It can thus be surmised that about 115 homes would be served by this program.) An updated list of licensed installers was obtained and a revised packet was mailed out to approximately 60 contractors. Homeowners who had participated at the 60/40% level were reimbursed an additional 30% of the installation of their ER systems. Within one month from the receipt of the amended contract, a public meeting was held. About 48 citizens were in attendance, representing about 34 homes. Attendees were re-introduced to the project and informed of the reason they were being given this opportunity: to protect the waters of the Coulee Baton Microwatershed. The three effluent reduction demonstration systems were detailed, with emphasis placed on the fact that (in this round of funding,) reimbursement would be restricted to the installation of these three systems only. Attendees were given timelines, application packets, and time for questions to be answered and concerns to be addressed. Consequently, 18 applications were handed in that night, and within the first two-week application pool 52 applications had been received at the Vermilion Parish SWCD office. More phone inquiries are coming in and applications are often picked up for neighbors.

Now that an increase in funding has been secured, homeowner participation has increased. Homeowners representing nearly half of the homes with failing systems in the microwatershed have submitted applications to have their systems repaired or replaced at the 90/10% cost-share level. Education and outreach efforts have been largely successful, with approximately 17,000 residents in the immediate area of the watershed being exposed to information regarding watershed health as it relates to septic systems. Inherent in any demonstration is a learning curve and as a result of these installations, the following upgrades are being recommended to the installers now that the amended contract is being executed:

- Spray Irrigation System: Install a larger capacity pump chamber (at least 300 gal for a 500 gallon primary treatment tank system), a ½ hp submersible turbine pump for the pump chamber, and two in-line filters - one on either side of pump chamber to protect spray heads from clogging.
- Rock Plant Filter system: Install an impermeable liner up to 16 mm in thickness.
- Gravel Field line: maximum width and depth in regulatory guidelines/schematics.

# *Implementation and Improvement*

As of 09/30/2009, the Acadiana Resource Conservation and Development Council has spent \$47,459.50 of the \$455,873 (federal funds) contract amount; \$19,568.31 of the total match amount (\$79,686); leaving a total federal balance of \$408,413.50.

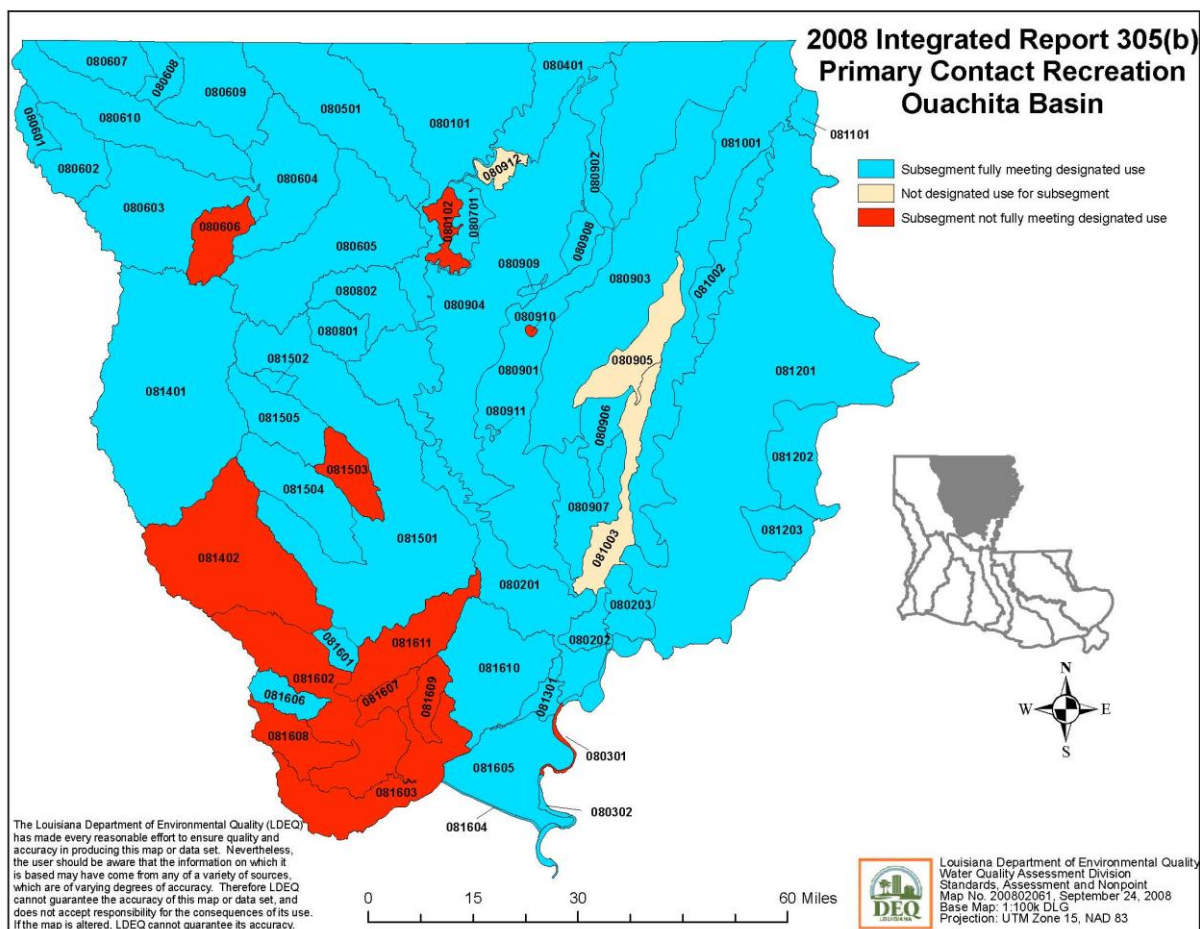


## USDA and SWCD Programs

During FY 2009, the USDA implemented approximately 31,855 acres of BMPs within the Mermentau River Basin through the EQIP. An additional 412 acres of practices were implemented through the CRP, and 654 acres of practices were implemented through the WHIP.

# Implementation and Improvement

## Ouachita River Basin

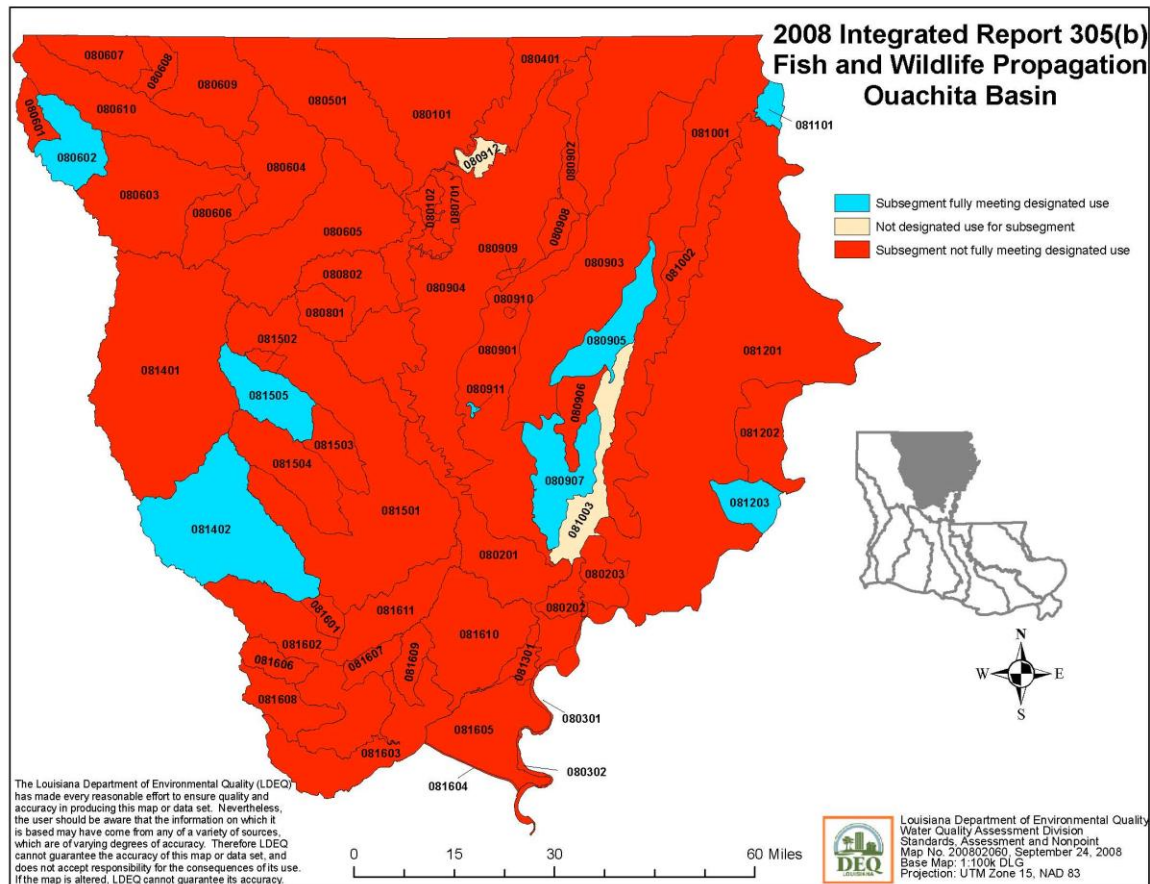


The 2008 IR indicated that there were 12 watersheds that were not meeting the standard for primary contact recreation use, compared to 14 in the 2006 IR. There were improvements in Bayou D'Arbonne from its headwaters to Lake Claiborne and from Lake Claiborne to Bayou D'Arbonne Lake. There was also improvement in Little River from Archie Dam to the Ouachita River. Beaucoup Creek from its headwaters to Castor Creek was added to the watersheds impaired for contact recreation.

The 2008 IR indicated a decline in water quality within the western portion of the Ouachita River Basin for the fish and wildlife propagation use, compared to the 2006 IR. There were only eight of the watersheds fully meeting this use compared to 15 in 2006.



# Implementation and Improvement



LDEQ collected water quality data for the Ouachita River and the Tensas River during 2009, with both water bodies indicating good water quality. The average concentration for dissolved oxygen was meeting or exceeding water quality standards and continued to improve from 2008. However the concentration of fecal coliform bacteria increased since 2008, but still remained below the criteria for primary contact recreation and needs some additional attention to determine where these increases may be coming from.

Average Dissolved Oxygen Concentrations Measured in mg/L for Selected Water Bodies in the Ouachita River Basin							
Water Body (subsegment)	1999	2004	2005	2006	2007	2008	2009
Ouachita River (080101)	5.83	5.92	5.90	6.06	6.48	6.17*	6.55
Tensas River (081201)	5.89	5.36	6.85	6.70	5.54	5.76*	5.87
*partial year data							

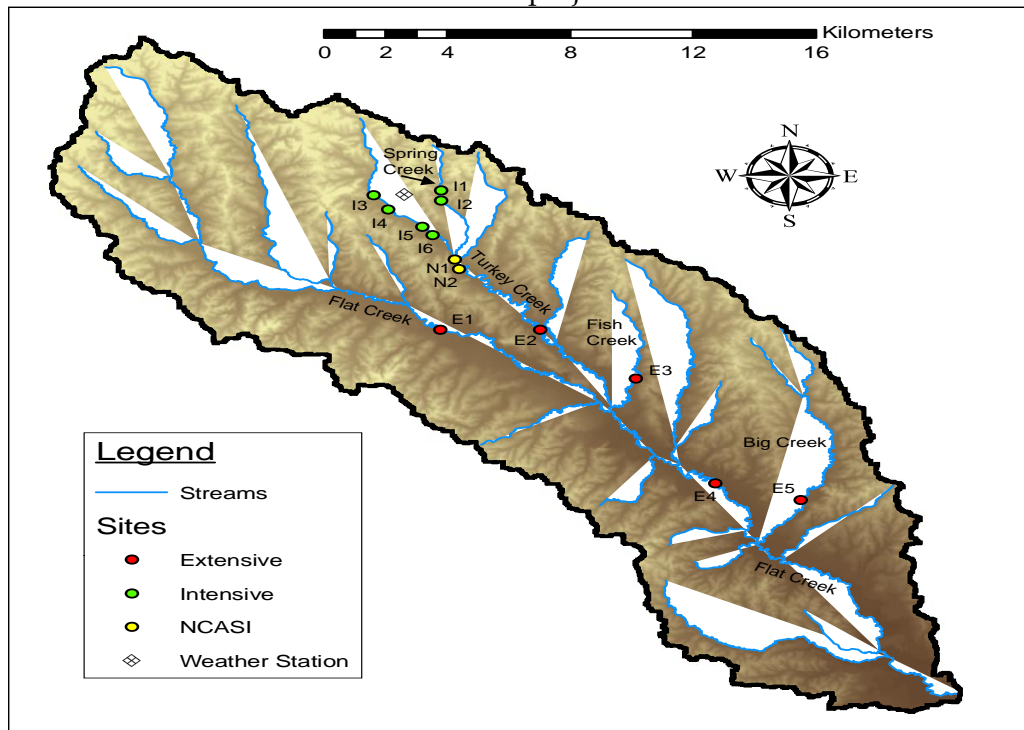
Average Fecal Coliform Concentrations Measured in Cells per 100 mL Sample for Selected Water Bodies in the Ouachita River Basin							
Water Body (subsegment)	1999	2004	2005	2006	2007	2008	2009
Ouachita River (080101)	127	163	35	94	139	52*	112
Tensas River (081201)	141	265	226	83	47	84*	179
*partial year data							

# Implementation and Improvement

The remaining water quality problems that exist in the Ouachita River Basin relate primarily to forestry, agriculture and urban storm water runoff. There have been quite a few watershed implementation plans written for impaired waters, but there is still more loading data and information needed on the effectiveness of the BMPs that are being recommended and utilized by landowners in these watersheds. Therefore, LDEQ has selected projects to examine forestry BMPs and to work in agricultural and urban watersheds in the Ouachita River Basin to implement practices and educate the public on what needs to be done to reduce the pollutant loads and improve water quality.

## *Monitoring the Effectiveness of Forestry BMP Implementation in the Flat Creek Watershed*

In the past year, the principal investigator has successfully achieved most of the project objectives and tasks outlined for the reporting period. These include sampling of 13 storm events, whereby flow measurements were conducted and water quality samples were collected from the 6 intensive and 5 extensive monitoring locations. A total of 12 monthly sampling field trips, whereby in-stream and flow measurements were conducted and water quality samples were collected from both the 6 intensive and 5 extensive sites. Two week-long benthic macroinvertebrate sampling field trips were undertaken in early April and late August, whereby more than 200 benthic samples were collected and assessments of stream habitat were conducted. When necessary, repair and maintenance of field equipment was accomplished during storm, monthly, and macroinvertebrate sampling events. All water samples collected during the reporting period were analyzed for nitrate, nitrite, total Kjeldahl nitrogen (TKN), ammonia, total and dissolved phosphorous, total suspended solids (TSS), fixed solids (FS), volatile solids (VS), and total solids (TS). Submissions of 4 quarterly progress reports have summarized major project activities, milestones, and problems encountered as well as remedial actions taken to overcome difficulties in project executions.



# *Implementation and Improvement*

In addition to the above achievements, the principal investigator has undertaken a number of activities that can contribute to achieving the overall goals of this forestry BMP demonstration project. These include hosting two field trips to the Flat Creek Watershed with LDEQ project manager, Mr. Gary Goay, to better communicate and disseminate ongoing project activities; and regular meetings with forestry industry personnel from Plum Creek Timber Inc. (PCT) of Joyce, LA to discuss all project-related field activities and expected support. This project also led to three presentations being made at the 15<sup>th</sup> Biennial Southern Silvicultural Research Conference in November 2008, Hot Spring, Arkansas, the most relevant forestry conference in the south and southeast U.S. The titles of the presentations were “Hydrologic influence on sediment transport of low-gradient, forested headwater streams in central Louisiana” by Philip Saksa, Y. Jun Xu and Richard Stich; “Stream carbon dynamics in low-gradient headwaters of a forested watershed” by April Bryant-Mason, Y. Jun Xu and Johnny M. Grace; and “Implications of diurnal dissolved oxygen patterns in low-gradient forested headwater streams for silvicultural Best Management Practices” by Y. Jun Xu, John Beebe and George Ice. The principal investigator also presented his work at the 17<sup>th</sup> National Nonpoint Source Monitoring Workshop in September, 2009 in New Orleans, LA. The topic of his presentation was “Monitoring the effectiveness of forestry best management practices in low-gradient headwater streams”. The same presentation was also given in November of 2009, for an annual project review meeting at LDEQ to report project activities and results and to propose further research of forestry site preparation impacts on water quality. Two abstracts were submitted and accepted for the National Water Quality Monitoring Council’s 7<sup>th</sup> National Monitoring Conference in Denver, CO. Water quality and quantity monitoring professionals from the U.S. and abroad, including representatives from USGS, EPA, NOAA, National Park Service, and National Forest Service, will gather to discuss monitoring strategies, innovations, and integration of information. The abstracts are: “Confounding Factors and Lessons Learned: Monitoring the hydrology of headwater streams of the Gulf Coastal Plain” by Kristopher Brown, Y. Jun Xu, and Den Davis; and “Complications associated with nutrient monitoring in low-gradient headwater streams” by Den Davis, Y. Jun Xu, Kristopher Brown. Four abstracts were submitted to the American Society of Agricultural and Biological Engineers’ 2010 TMDL Conference, Watershed Management to Improve Water Quality, in Baltimore, MD. The abstracts are: Implications of stream flow changes following timber harvest for TMDL development in forested headwaters by Kristopher Brown, Yi-Jun Xu, Dan Thomas; Importance of storm flow sediment loading for TMDL development in forested headwaters by Kristopher Brown, Yi-Jun Xu, Den Davis, Dan Thomas; Dissolved oxygen analysis of a northern Louisiana headwater stream during timber harvesting operations by Abram DaSilva and Y. Jun Xu; Changes in Benthic Macroinvertebrate Communities Following Timber Harvest in Headwater Streams of a Louisiana Low-gradient Watershed by Derrick Klimesh and Y. Jun Xu.



# *Implementation and Improvement*



In summary, this past year has been another very successful year for the forestry project. As the project neared the end of its post-harvest phase, the principal investigator was able to assess the long-term data gathered over the past four years. Presentations made by the principal investigator at regional and national conferences helped to disseminate findings to the broad forestry community and general public, as well as demonstrate collaborative efforts in water quality protection between state and federal agencies, the forest industry, and academia. This project will continue to make a positive contribution to forestry BMP assessment in this region.

## ***Reduction in Nonpoint Source Contaminant Loads to Bayou Chauvin in the Ouachita River Basin***

The project began on April 1, 2006, and the overall goal of the project was to identify specific sources of NPS loading to Bayou Chauvin watershed and implement BMPs that will improve water quality. To accomplish this goal, previous water quality data was studied and locations were sampled and analyzed – some of this was done during FY 09. Educational workshops and storm drain marking also occurred during this fiscal year. It was determined that numerous issues/problems prevent Bayou Chauvin from achieving water quality goals and meeting its designated uses. Both point and nonpoint sources of pollution impact the watershed. However, improvements in water quality were observed following the rerouting and upgrading of several



structures. As a result of this hydromodification, a use attainability analysis (UAA) may be warranted for this system. A collective effort by residents, developers, agricultural producers, foresters, and governmental agencies within the watershed is crucial to meet water quality standards. The project ended on September 30, 2009.

# *Implementation and Improvement*

## ***Reduction of Pesticides and Nutrients in Bennett's Bayou Following Implementation of BMPs***

The project began on July 1, 2007, and the overall goal of this project was to track the success of three Best Management Practices (BMPs) that were implemented to reduce nonpoint source (NPS) nutrients and pesticides in the Bennett's Bayou watershed. The three specific BMPs and objectives evaluated were: 1. Monitor simazine and selected nutrients in surface water discharging through a BMP wetland detention basin at Chennault Park Golf Course, 2. Evaluate the long-term effect of agricultural BMPs implemented at the ULM farm by tracking appropriate pesticides and selected nutrients in runoff following application, and 3. Determine the success of homeowner educational programs and storm drain marker programs implemented along Bennett's Bayou by measuring selected contaminants from storm water runoff. Numerous sampling events were conducted in order to assess the effectiveness of the various BMPs during FY 09. Of the three BMPs evaluated, only the agricultural BMPs implemented at the ULM farm were found to be beneficial for reducing selected pollutants and improving water quality to Bennett's Bayou. The project ended on August 31, 2009.



## ***Establishment of Baseline Conditions at the Mollicy Farms Unit of Upper Ouachita River National Wildlife Refuge***

The Nature Conservancy initiated this project in the second quarter of 2009. A QAPP has been completed and approved and describes the project management and the collection, analysis, evaluation and reporting of all data collected during the project.

Baseline data will be interpreted and reported for hydrologic flow, water quality and biological indices directly related to hydrologic and water quality conditions at the project site and surrounding areas. Concerning the analyses, the GIS project boundaries have been overlain with the most recent information (land use / land cover, geo-referenced historic photographs,

# *Implementation and Improvement*

aerial photography, United States Fish and Wildlife Service planting units and constructed ditches).

Concerning the biological sampling for fish species density and diversity, the fish sampling was conducted in July of 2009. Fish were identified, measured and weighed. The literature research was completed as well. Aquatic invertebrates were collected on July and August and processed in September.

Almost 2000 aerials have been mosaiced and geo-referenced and the most recent aerial imagery and land use / land cover has been digitized for the development of the internal hydrological restoration plan.

High water across the project site caused by flooding of the Ouachita River continues to be a challenge. The Mollicy project area was flooded for a period of time and this has made access to the site very difficult. The installation of sampling equipment has been hindered due to the persistence of high water and the resulting unsafe conditions. It has been decided to use the levees themselves as platforms for the water samplers. This will provide a stable substrate for installation and provides a safe area during flood conditions to collect the samples and service the units.

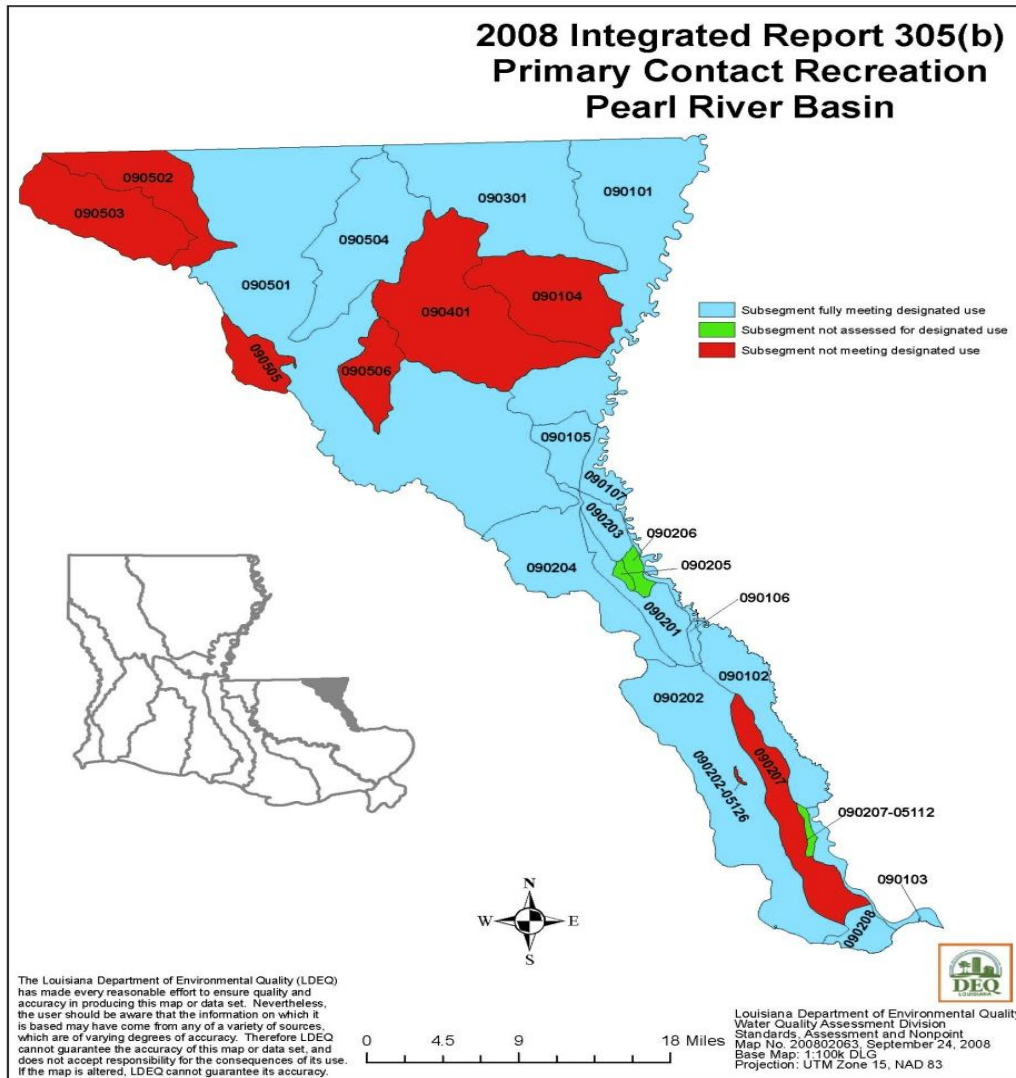
## USDA and SWCD Programs

During FY 2009, the USDA implemented approximately 80,450 acres of BMPs within the Ouachita River Basin through the EQIP. An additional 10,569 acres of practices were implemented through the CRP, 4,337 acres of practices were implemented through the WRP, and 1,640 acres of practices were implemented through the WHIP.



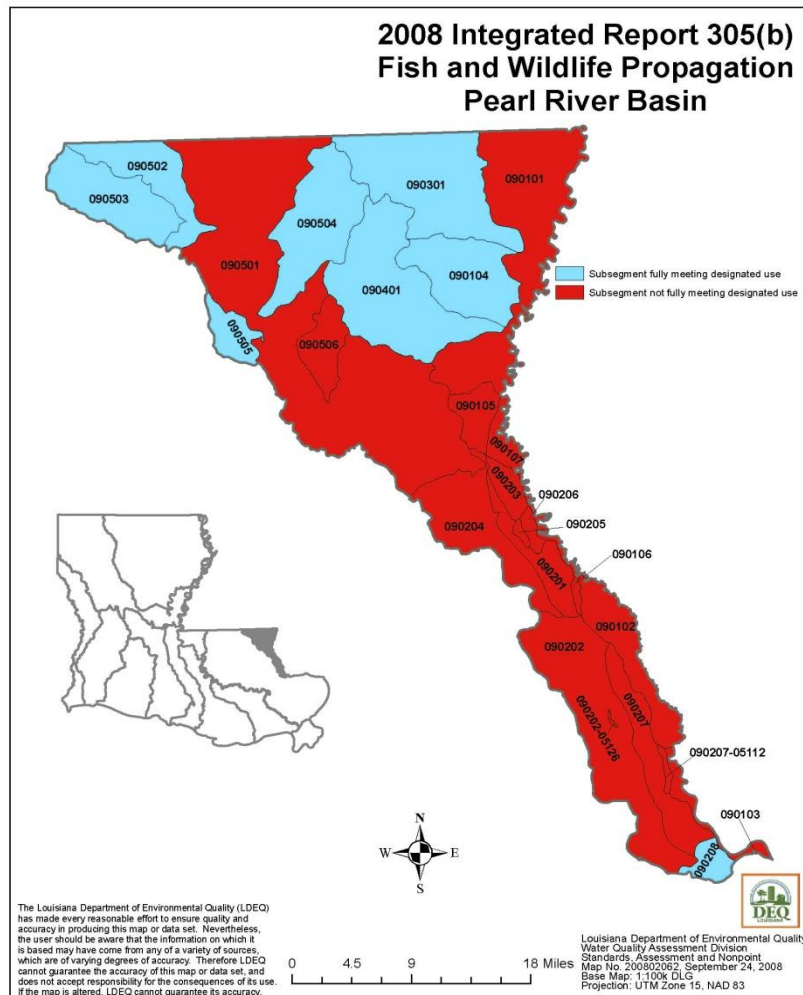
# Implementation and Improvement

## Pearl River Basin



The 2008 IR indicated that there were eight watersheds that were not meeting the standard for primary contact recreation use compared to seven in 2006. There were improvements in some of the water bodies but others declined in water quality. The Pearl River from the Mississippi state line to the Pearl River Navigation Canal and Pushepatapa Creek from its headwaters and tributaries at the Mississippi state line to Pearl River floodplain improved. However, Little Silver Creek from headwaters to Bogue Chitto River and the Middle Pearl River and West Middle Pearl River from West Pearl River to Little Lake declined and were added to the list of water bodies that are impaired for contact recreation.

# Implementation and Improvement



The 2008 IR indicated that there were eight water bodies that were fully meeting the fish and wildlife propagation use compared to only five in 2006. The three water bodies that improved included Peters Creek from its headwaters to the Pearl River, Lawrence Creek from its headwaters to the Bogue Chitto River and Bonner Creek from its headwaters to the Bogue Chitto River.

The water quality data from 2008 continued to indicate good water quality for the Pearl River, with the average annual concentration of dissolved oxygen exceeding the criteria necessary to protect the fish and wildlife propagation use. The data also continued to show improvements in the average annual concentration of fecal coliform bacteria with the values falling well within the criteria necessary to protect the contact recreation uses. There was no new data in 2009.

Average Dissolved Oxygen Concentrations Measured in mg/L for Selected Water Bodies in the Pearl River Basin						
Water Body (subsegment)	1996	1997	1998	2001	2006	2008
Pearl River (090101)	8.84	9.73	7.95	7.56	6.75	8.34*
*partial year data in 2007						

# Implementation and Improvement

Average Fecal Coliform Concentrations Measured in Cells per 100 mL Sample for Selected Water Bodies in the Pearl River Basin						
Water Body (subsegment)	1996	1997	1998	2001	2006	2008
Pearl River (090101)	144	483	3854	509	194	111*
*partial year data in 2007						

The water quality is relatively good in the Pearl River, but there have been TMDLs completed that indicated that turbidity and sedimentation is a problem so LDEQ entered into an agreement with the Louisiana Nature Conservancy to examine the sources of sediment in order to understand how to implement the TMDL. This was a joint effort with the Mississippi Nature Conservancy and a team of experts that want to protect the Pearl and manage it for its high ecological significance.

## *Pearl River Watershed Monitoring and Source Identification*

The overall goal of the Pearl River Watershed Monitoring Project was to conduct a preliminary assessment of channel stability and sediment regime to document current conditions of the lower Pearl River and Bogue Chitto River. In addition, the project would provide baseline information for subsequent, more focused evaluation of sources of stress to the Pearl River system. Geomorphology of all reaches in Louisiana has been evaluated. In total, 356 river miles have been evaluated, with 190 miles surveyed within the state of Louisiana. Land cover assessments were conducted using National Land Cover Data comparisons of 1992 and 2001 data to determine trends to waterbody subsegments of the Pearl River Basin of nine land cover types: Open water, Development, Barren land, Forest, Grassland, Pasture, Cultivated crops, Urban/recreational, and Wetlands.

Locations of 10 reaches spanning high and low levels of potential sediment generation were selected in the Pearl River. Seventeen cross sections (1 cross section at three sites were only able to be measured) were measured for bathymetric profiles of configurations of channel bottoms and bank elevations. Two of these reaches were located in the Lower Basin (one in the West Pearl, the other in the "East" Pearl) and at each two cross-sections were selected and measured. Cross-sections were marked with semi-permanent stakes to monument their locations and were later revisited in to measure channel and bank profiles to quantify sediment erosion rates. These estimates of sediment erosion rates would be used to calibrate the qualitative geomorphic surveys conducted at the same locations.

All seven sites for sediment sampling were re-surveyed during near-flooding conditions. Sediment analyses was completed and quantified for review and interpretation by the Project Manager. In addition, a survey of the effects of the I-10 interstate on sheet flow and sediment concentrations above and below the interstate was initiated in the West and Middle Branches of the basin. Four sampling locations for bedload and suspended sediment were selected to determine sediment routing in the West and Middle branches, and to quantify levels of sediment loading upstream and downstream of the I-10 Bridge that spans the Middle Pearl.

Land use analysis using NLCD (1992) data was updated with more contemporary results (NLCD 2001 data); NASS (2006) data was compared to NASS data from 1999. All assessments



# *Implementation and Improvement*

used HUC 12 sub-watershed delineations. The four cross-sections located in Louisiana were revisited to assess changes in channel dimension. Channel width, bank elevations, and bathymetric profiles were measured and recorded at each cross-section.

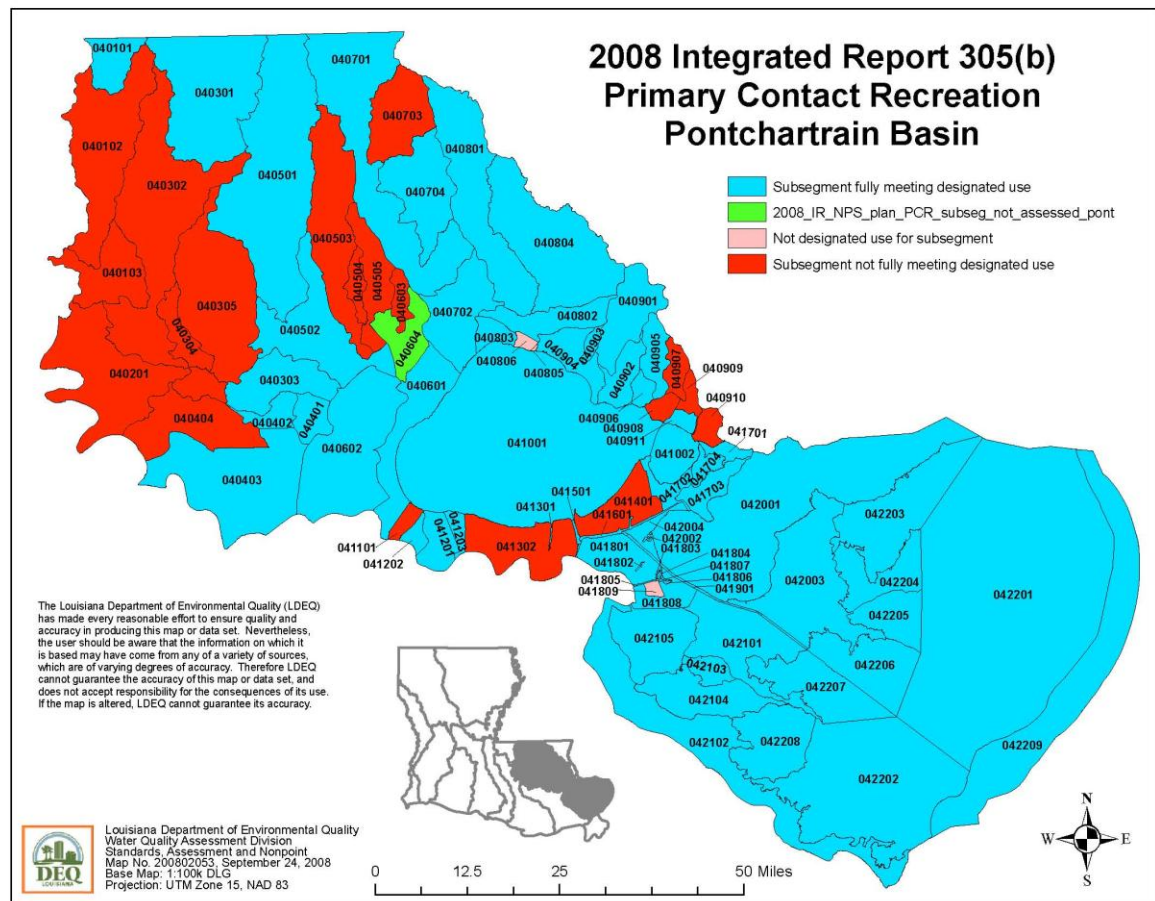
A meeting with the Ross Barnett Reservoir Managers was facilitated. Stacey Shankle (Director of Conservation Programs-Mississippi Chapter), Steve Haase (Senior Biohydrologist-Louisiana Chapter), and Tom Kennedy met with the Ross Barnett engineer (John Sigman) and manager (Benny French) on June 9, 2009. Stacey discussed the role of The Conservancy in reaching out to resource managers to develop a dialogue between conservation needs and resource management. Steve discussed his involvement in determining geomorphic condition and an understanding of the hydrologic characteristics of the Pearl River. Tom presented an outline of The Conservancy's involvement with the Pearl River, development of a Comprehensive Area Plan and stakeholder involvement, and the current process underway to quantitatively assess changes in the hydrologic characteristics of the Pearl River since the Ross Barnett Reservoir was constructed. Discussions with Southeastern Louisiana and Tulane Universities were initiated to collaborate over linking the hydrologic characteristics of the Pearl River with long-term fish survey records.

Sediment analyses for the second round of data collections and review of the first round of data were conducted. A synthesis of methods used to classify reach segments of the Pearl River was conducted. The data compiled by the GIS Intern on the distribution of sand and gravel mines was finalized. The work involved was 20% field assistance and 80% GIS analysis. The sediment analysis for a watershed-scale evaluation was completed. Regression models to relate sediment discharge to land use practices with GIS-based hydrology tools were developed. Steve Haase and Tom Kennedy compiled all data for the final report and have evaluated the results. The final report has been submitted and EPA region 4 has already approved the report. A hard copy of the report along with a CD was sent to EPA region 6 for review. EPA region 6 approved the final report on January 22, 2010.



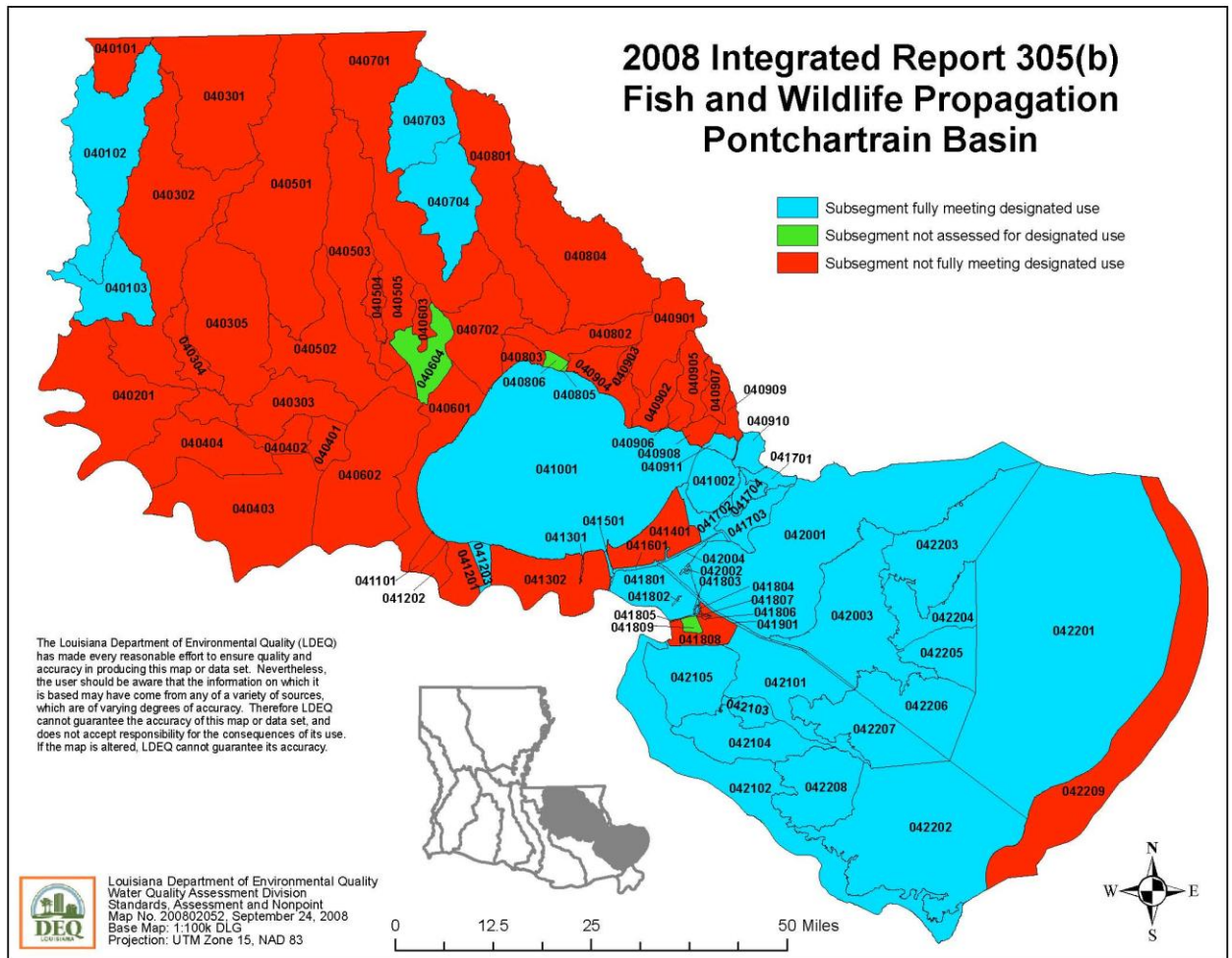
## Implementation and Improvement

## Pontchartrain Basin



The water quality information from the 2008 IR indicated that there had been substantial improvement in the number of water bodies impaired for contact recreation. The 2008 IR indicated that there were 20 water bodies impaired for contact recreation compared to 32 in the 2006 IR. These improvements can be attributed to the on-the-ground work of the Lake Pontchartrain Basin Foundation, the Natural Resource Conservation Service (NRCS) and the parishes and cities that are working to improve water quality from rural and urban areas.

# Implementation and Improvement



The water quality information from the 2008 IR indicated that there was a decline in water quality for the fish and wildlife propagation use, with four additional watersheds moving to the category of non-attainment of water quality standards. This includes the Comite River from Little Comite Creek and Comite Creek at Mississippi state line to Wilson-Clinton Highway; Pass Manchac from Lake Maurepas to Lake Pontchartrain; Bayou St. John and W-14 Main Diversion Canal from headwaters to Salt Bayou.





# Implementation and Improvement

The most recent water quality data for the Tickfaw and Tangipahoa Rivers indicated that the average dissolved oxygen concentration continued to improve and meet the state's water quality standard, and the fecal coliform concentrations have shown drastic improvements.

Average Fecal Coliform Concentrations Measured in mg/L Sample for Selected Water Bodies in the Pontchartrain Basin										
Water Body (subsegment) (DO)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Tickfaw River (040501)	8.09	7.36	7.69	7.67	7.60	8.17	8.06	8.18	7.98*	8.26
Tangipahoa River (040701)	8.43	7.67	7.83	8.12	8.08	7.80	8.36	8.55	8.30*	8.51

Average Fecal Coliform Concentrations Measured in Cells per 100 mL Sample for Selected Water Bodies in the Pontchartrain Basin										
Water Body (subsegment) (FC)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Tickfaw River (040501)	114	644	2308	717	1399	814	579	207	735*	20.68
Tangipahoa River (040701)	100	282	3078	1998	2589	680	1203	240	2161*	35.86

## USDA Programs

During FY 2009, the USDA implemented approximately 6,143 acres of BMPs within the Pontchartrain Basin through the EQIP. An additional 2,537 acres of practices were implemented through the Conservation Reserve Program (CRP), and 4,510 acres of practices were implemented through the WHIP.

There has been a lot of progress made in water quality on the north shore of Lake Pontchartrain but this basin has some of the most rapidly developing parts of the state so LDEQ continues to work on finding solutions that will work in urban areas of Louisiana to address nonpoint source loads. Schools, churches and parks are green infrastructure that are typically stable places within a city where people spend a great deal of time. These areas can be utilized to educate about and demonstrate the types of practices that need to be implemented throughout the urban landscape. The results of these projects will be incorporated into the watershed plans for these urban watersheds.

In addition to the urban part of the watersheds, there are also rural areas that still need new technology made available to reduce erosion from the fields. The Watershed Coordinators working

# *Implementation and Improvement*

through the Resource Conservation and Development Districts help LDEQ select which projects are needed by the landowners to improve their operations and reduce nonpoint source pollution from their lands.

## ***Stormwater Best Management Practices (BMPs) in Wetland Landscape Design: Planning, Constructing, and Monitoring BMPs in Partnership with Woodlawn High School, Baton Rouge, LA***

This project involves the construction of a wetland/retention pond on the campus of Woodlawn High School. After a delay due to site access issues, extensive work has been completed on the project - water samples were taken, outreach materials created, approximately 1600 trees, shrubs and emergent plants have been planted at the project site, and an irrigation system has also been installed. The project is currently in the post-construction period, and under a one-year no-cost extension. Water monitoring/sampling equipment is presently installed at the project site and collecting post-construction data.



## ***Grain Drills on Highly Erodible Lands***

Three no-till grain drills were purchased and have been placed at local farm co-ops throughout the Florida Parish area. The drills are located at Spring Creek, and Kentwood Co-ops in Kentwood and Tri-Parish Co-Op in Slaughter, and a rental program has been established for their use. Environmental objectives include reducing soil erosion, the amount of fertilizer applied and improving water quality in areas that are affected by the livestock industry north of Lake Pontchartrain. The use of grain drills would allow for directly seeding the pasture sod without tilling the landscape, which would lower the estimated annual soil loss to 1 ton per acre.

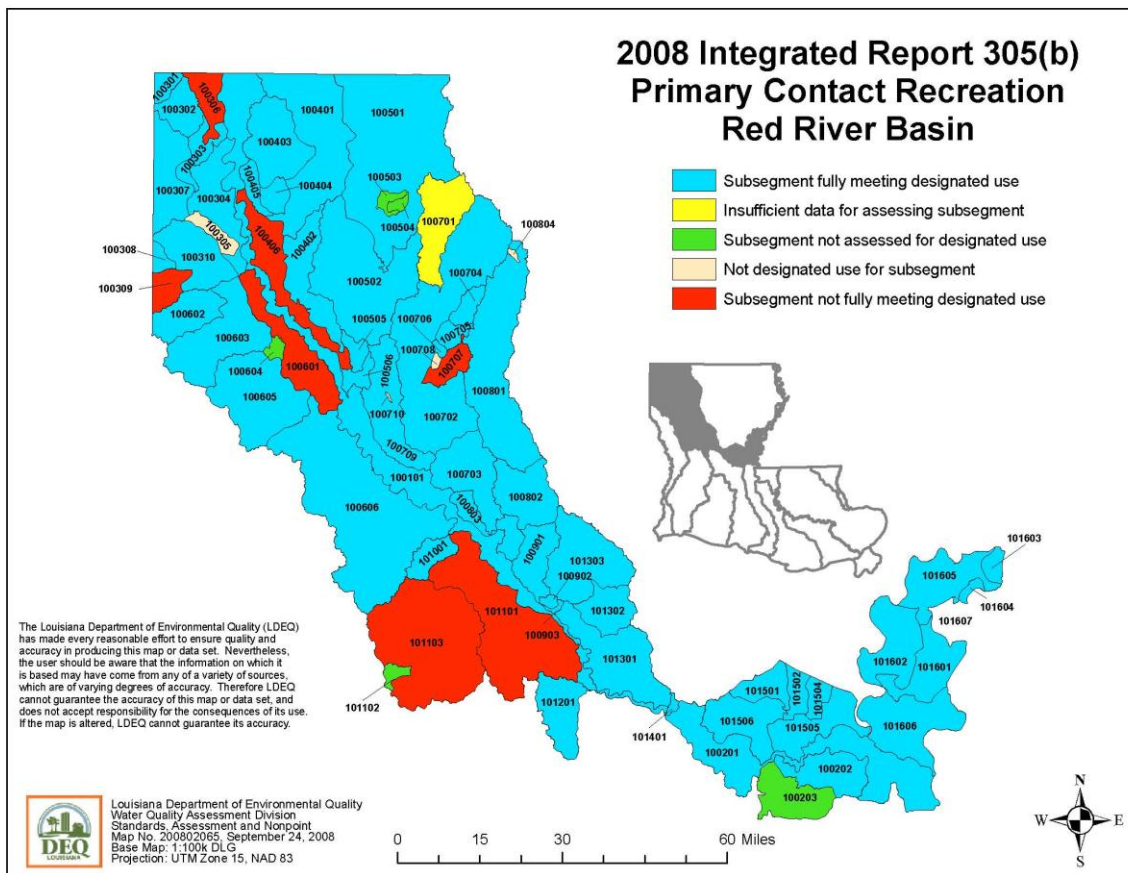
# *Implementation and Improvement*





## Implementation and Improvement

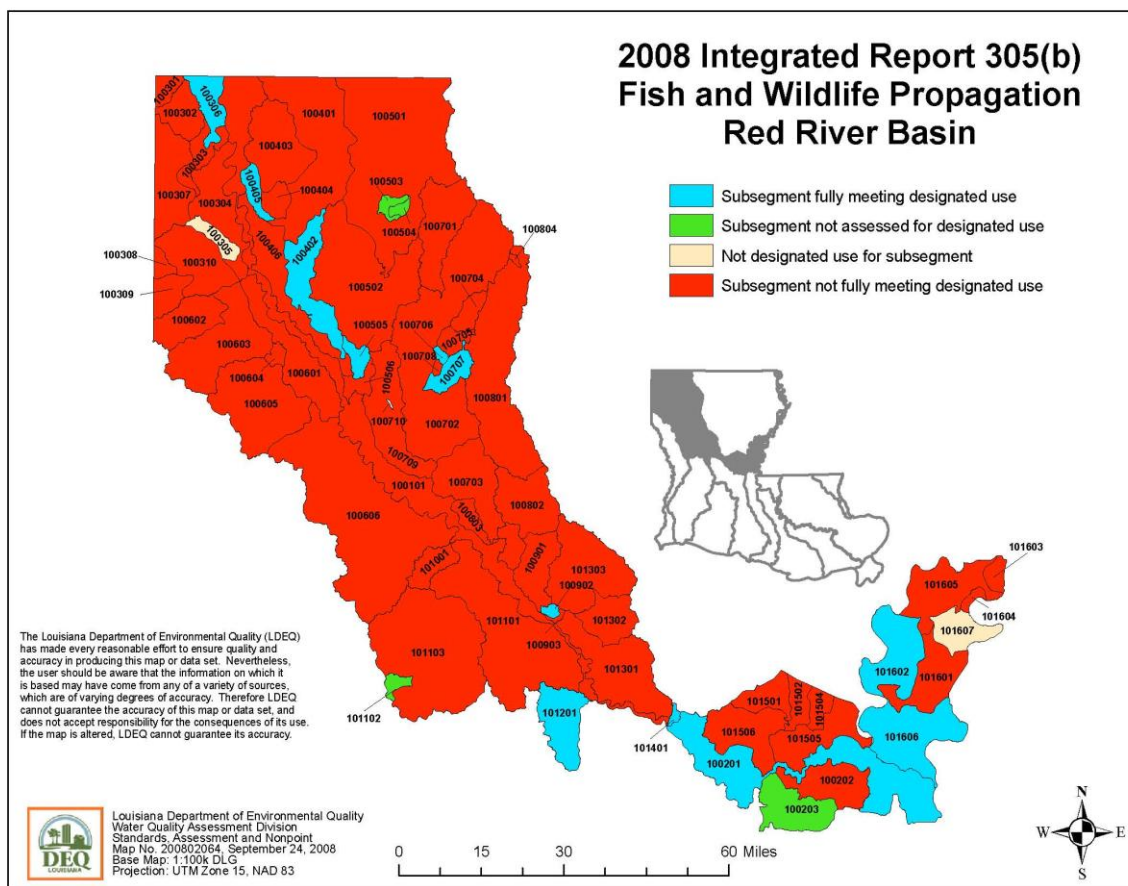
## Red River Basin



The 2008 IR indicated that there were eight watersheds listed as impaired for primary contact recreational uses compared to seven in 2006. Some of the water bodies that were listed in 2006 improved and were removed from the impairment list, but others declined and were added.

The 2008 IR indicated that there were a few improvements in the number of impaired watersheds in the lower portion of the Red River Basin but the upper portion of the basin indicated declines in several of the watersheds, resulting in more water bodies being listed for fish and wildlife propagation in 2008.

# Implementation and Improvement



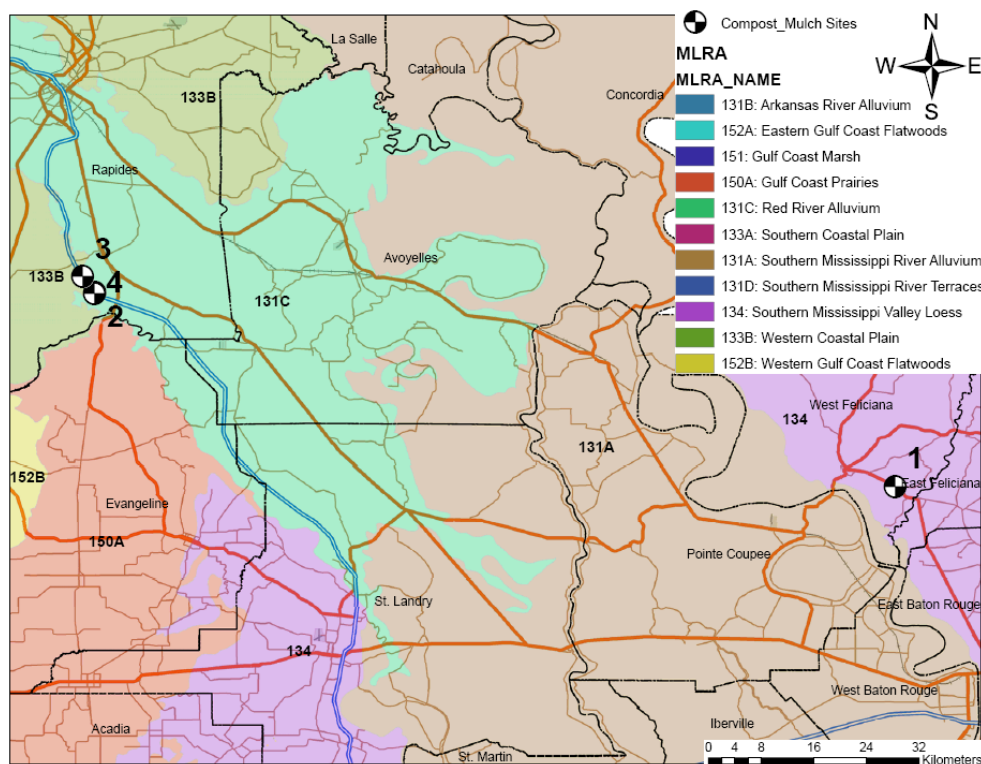


# Implementation and Improvement

In addition to agricultural, forestry and urban runoff, highway runoff can cause sedimentation in streams. There have been areas along I-49, Highway 167 and Highway 171 that have caused erosion problems and complaints from the local people and other agencies. Therefore, LDEQ agreed to work with LDOTD and LSU on a project to find better erosion control methods for highway projects in Louisiana. These BMPs can then be incorporated into the state highway BMP erosion control manual and be utilized on all projects.

## ***Highway Right-of-Way Erosion Remediation: Implementation of a Residue Management BMP***

The goal of this project is to implement and quantify the use of mulch/compost as an erosion control BMP. Wood waste from highway construction will be processed into filter berms and socks and placed along disturbed highway right-of-way areas. Mulch/compost blankets will also be applied to highway right-of-ways. Runoff and mulch from these areas will be collected and analyzed/quantified in order to assess the effectiveness of this technology. The PIs will work with the Louisiana Department of Transportation on an outreach/education campaign to promote the findings and accomplishments of this study. The QAPP for this project is currently under review by EPA.



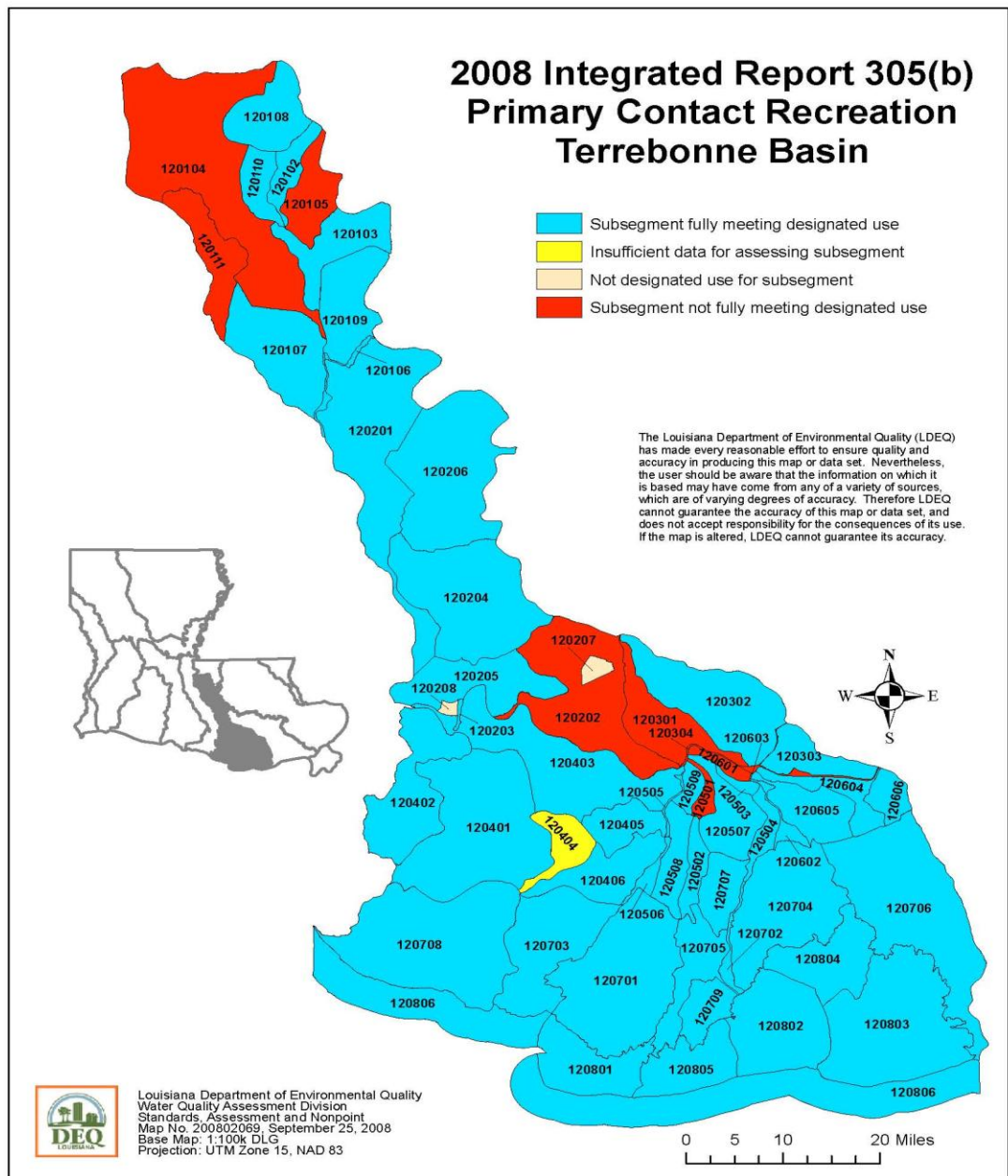
### USDA Programs

During FY 2009, the USDA implemented approximately 32,052 acres of BMPs within the Red River Basin through the EQIP. An additional 1,419 acres of practices were implemented through the CRP, 2,882 acres of practices were implemented through the WRP, and 1,384 acres of practices were implemented through the WHIP.



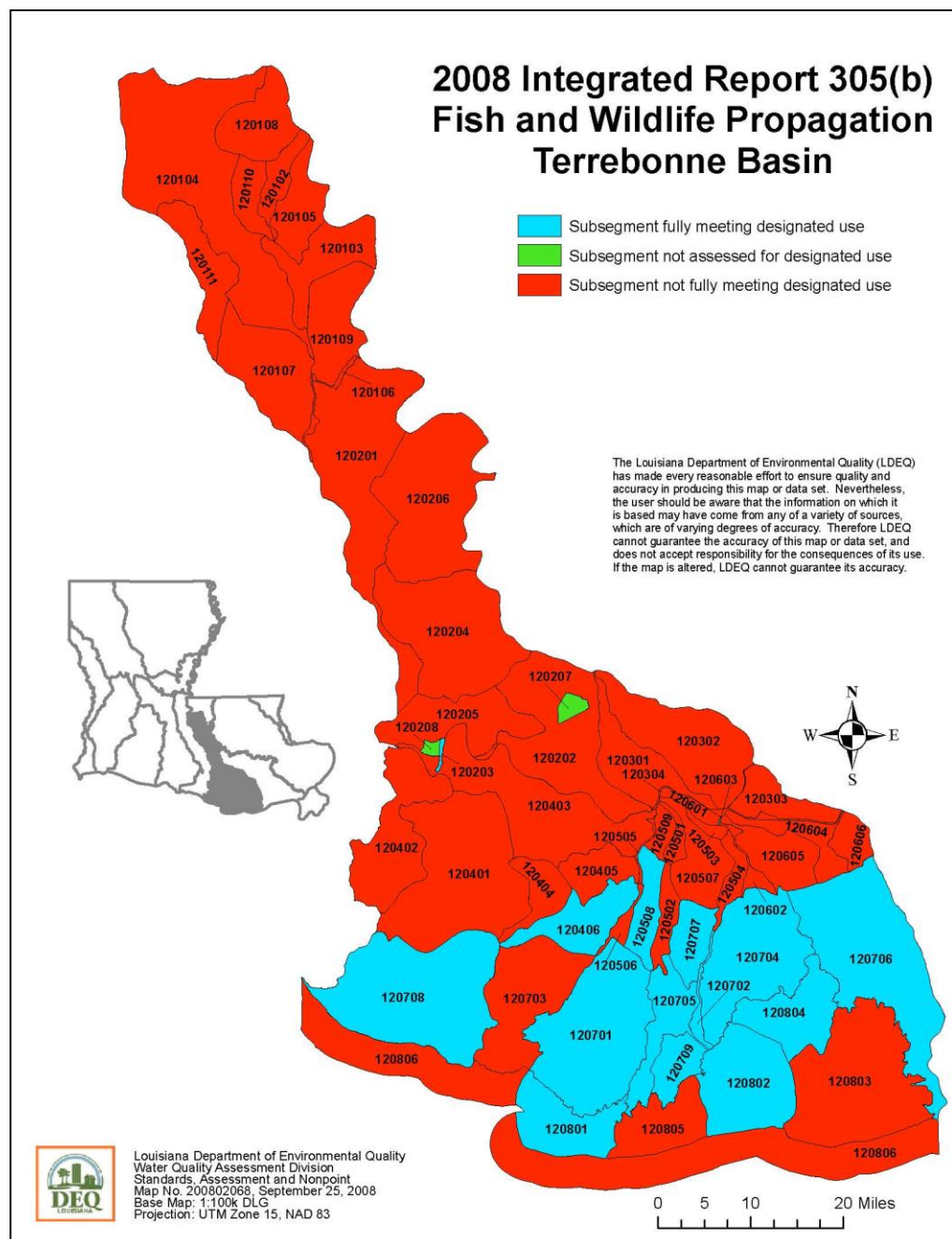
# Implementation and Improvement

## Terrebonne Basin



The 2008 IR indicated that Bayou Blue had improved for fecal coliform and could be removed from the impairment list for primary contact recreation, but Bayou Grand Caillou was added to the list for exceeding the criteria for fecal coliform. The 2008 IR indicated that many additional subsegments did not meet the fish and wildlife propagation use, while a few subsegments improved and were removed from the list.

# Implementation and Improvement



The primary problems are low dissolved oxygen and elevated turbidity. EPA and LDEQ are working on a Use Attainability Analysis (UAA) for the Terrebonne Basin to determine what the appropriate water quality criteria should be for dissolved oxygen. Through the UAA process, the chemical and biological data are examined to determine if the use is being met.

# *Implementation and Improvement*

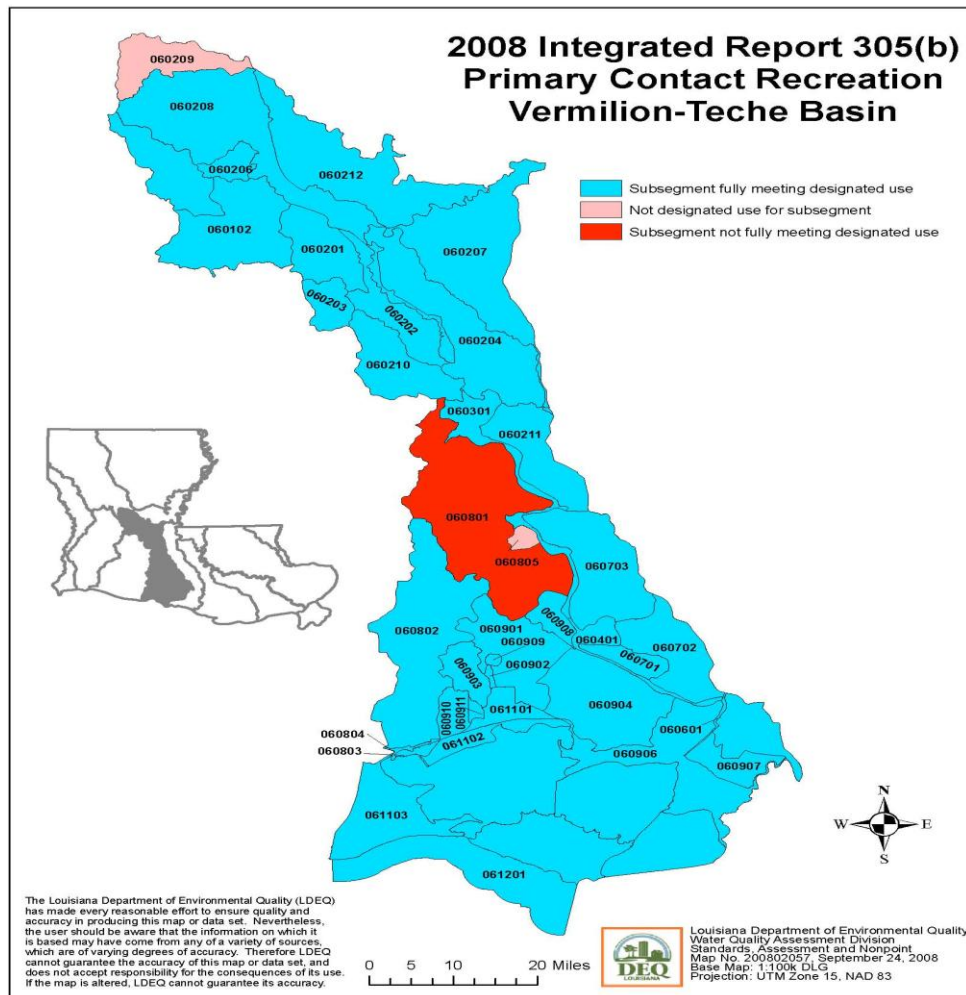
## USDA Programs

During FY 2009, the USDA implemented approximately 14,709 acres of BMPs within the Terrebonne Basin through the EQIP. An additional 51 acres of practices were implemented through CRP, and 63 acres were implemented through the WHIP.



# Implementation and Improvement

## Vermilion-Teche River Basin



The 2008 IR indicates that there has been substantial water quality improvement in the Vermilion-Teche River Basin since 2006. The 2006 IR indicated that 13 watersheds were not in compliance with the primary contact recreational use while the 2008 IR indicated that there were only two watersheds that were still impaired for fecal coliform bacteria. These improvements can be attributed to local and state governments and the general public that lives within the basin. LDEQ has worked with the Acadiana Resource Conservation and Development District and the Bayou Vermilion District along with local soil and water conservation districts and the Natural Resource Conservation Service (NRCS) to improve the use of BMPs on rural lands and educational programs on home sewage systems.

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Average Dissolved Oxygen Concentrations Measured in mg/L for Selected Water Bodies in the Vermilion-Teche River Basin								
Water Body (subsegment)	1998	2003	2004	2005	2006	2007	2008	2009
Vermilion River (060802)	5.27	4.31	4.03	4.83	4.98	4.05	4.14*	5.03
Bayou Teche (060401)	5.24	4.10	4.70	4.89	4.51	4.59	5.09*	4.19
*partial year data								

The data from 2009 indicated improvement in dissolved oxygen and fecal coliform bacteria for the Vermilion River and a decline in Bayou Teche.

Average Fecal Coliform Concentrations Measured in Cells per 100 mL Sample for Selected Water Bodies in the Vermilion-Teche River Basin								
Water Body (subsegment)	1998	2003	2004	2005	2006	2007	2008	2009
Vermilion River (060802)	1860	1412	2861	239	137	168	752*	527
Bayou Teche (060401)	2194	943	480	439	152	136	213*	757
*partial year data								

Within the Vermilion-Teche River Basin, there have been several TMDLs completed and watershed implementation plans written but in order to continue to see water quality improvement in this part of the state, there is still quite a bit of work that needs to be done. During this year, LDEQ completed a project to examine some of the problems in the Bayou Courtableau and also continued its work with the Bayou Vermilion District to improve water quality in Bayou Vermilion.

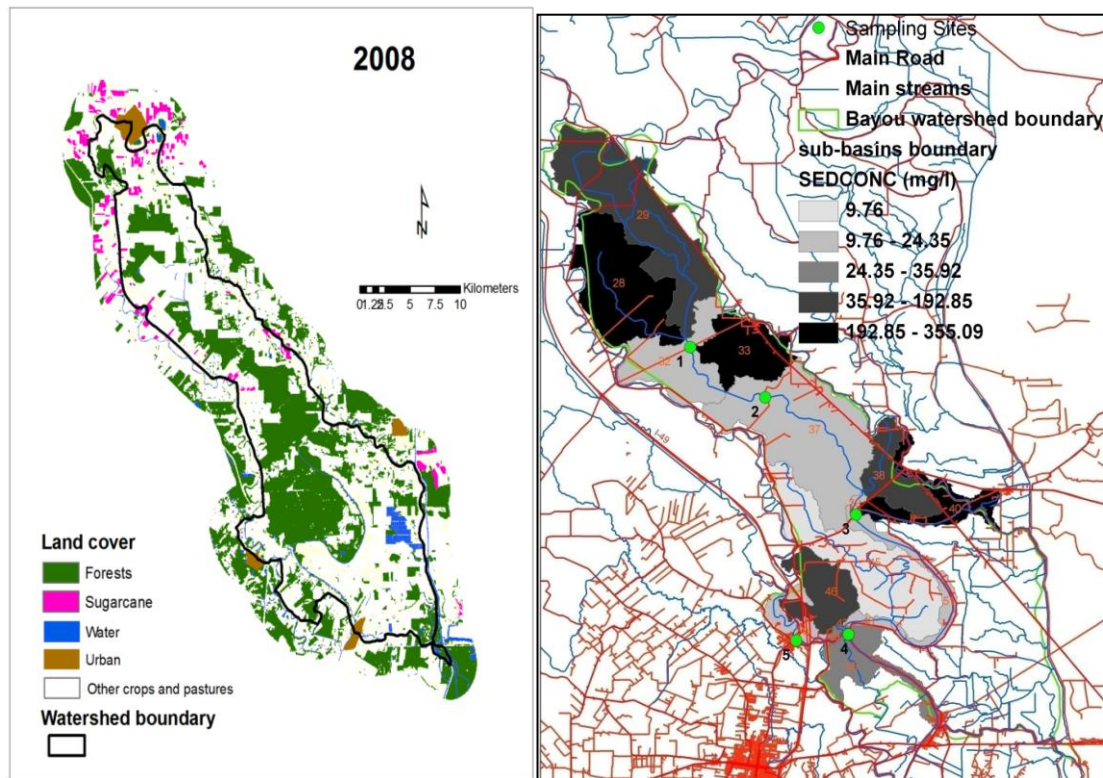
## *Identifying Critical Nonpoint Source Areas of Pollution to Bayou Courtableau*

Bayou Courtableau in subsegment 060204 in 2002 was defined as impaired because of its high level of total fecal coliform, turbidity, total suspended solids, sulfates, and nitrogen, especially ammonia nitrogen. The watershed was therefore listed as not fully supporting the water quality standard for the propagation of fish and wildlife. In the 1993 Nonpoint Source Pollution Assessment Report specifically, irrigated crop production, agriculture, and municipal sources were listed as suspected sources of pollution (LDEQ, 1993). In the 1998 Louisiana Water Quality Inventory (LDEQ, 1998), however, natural and unknown sources were documented.

The predominant landuse in the Bayou Courtableau drainage area is agriculture, which could contribute to high sediment and nutrient loads through surface and subsurface runoff. Although Bayou Courtableau was sampled monthly at one location in 1998, it is currently unknown to what relative extent agricultural activities contribute to sediment and nutrient loads. It is also unknown which specific location(s) may be a major nonpoint source area. Such information is critical for developing effective improvement strategies and plans; however, to obtain the information often requires long-term and costly field measurements, particularly from a large spatial scale. An alternative approach is assessment using hydrologic models that are capable of integrating spatial data on soil, topography, and landuse to simulate surface runoff and subsurface flow.



# Implementation and Improvement



This project's objective was to conduct a computational analysis of hydrology and water quality across Bayou Courtableau watershed. The immediate goal of this project is to identify suspected areas and agricultural activities that may cause high sediment and nutrient export to Bayou Courtableau. Results gained from this project will provide crucial information on what actions need to be taken in order to develop effective strategies and plans to monitor and improve water quality conditions within Bayou Courtableau watershed.

This project used a modeling approach to determine nonpoint source areas of pollution in the Bayou Courtableau watershed located in south-central Louisiana in subsegment 060204. The project analyzed long-term rainfall and discharge patterns, simulated loads and fluxes of total suspended solids, organic nitrogen, nitrate nitrogen, and total phosphorus, and assessed land use change and watershed terrain characteristics to identify potentially critical areas of pollution. Major findings from the project can be summarized as follows:

- The upper- and middle-east parts of the Bayou Courtableau watershed are most suspicious for their high concentrations and mass loadings of total suspended solids, organic nitrogen and total phosphorus. These include the sub-watersheds directly below Bunkie (sub-watersheds 28, 29 and 30) and around Lebeau/Palmetto (sub-watersheds 38 and 40). The two areas are located along a major highway (Hwy 71) and are mostly intensive in farming and urban development, indicating that both agriculture and residential activities could contribute to the pollution.
- Bayou Courtableau is a low-lying (< 20 m) watershed with a very gentle topography. The elevation change within its 308-km<sup>2</sup> land area is only 13 m, with a decreasing trend from north to south. Soils in the watershed are predominantly deep and very poorly drained series. Such physical watershed characteristics have created a large wetland area downstream of Bayou Wauksha, which may have contributed to the reduction of

# *Implementation and Improvement*

sediment and nutrient loads to the main flow of Bayou Courtableau as shown in both the modeling results and in the one-time field water samples.

- Covering nearly 60% of the total land area, agriculture is the dominate land use in the Bayou Courtableau watershed, followed by forests (24%) and wetlands (16%). The satellite image analysis shows that over the past 18 years, this land cover mosaic has not changed, though inter-annual changes of different crops in the farming area may have occurred. This indicates that the current water quality conditions downstream have not been effect much regarding land use changes.
- The use of the term “Bayou Courtableau” for the current LDEQ subsegment 060204 is inappropriate. In reality, much of the subsegment is the direct drainage area of Bayou Wauksha and its tributaries. Bayou Wauksha flows throughout the entire subsegment from north to south and only joins Bayou Courtableau about 3 miles northwest of Port Barre. Based on our estimate, about 80% of the total discharge at Port Barre originates from Bayou Courtableau which has the combined flows of Bayou Boeuf and Bayou Cocodrie. Therefore, previous water quality measurements conducted at Port Barre can not accurately represent the water quality conditions for the subsegment 060204. We suggest 1) either change the name of the subsegment to Bayou Wauksha watershed or 2) include the drainage areas of Bayou Boeuf and Bayou Cocodrie, which contribute the largest amount of flow to Port Barre.
- In our field survey we found that the St Landry Parish Landfill is located right next to Bayou Boeuf. Surface and groundwater runoff from the landfill run into the bayou. As subsegment 060204 (Bayou Courtableau) is currently classified as impaired in fecal coliform and sulfates, monitoring of the water quality conditions downstream of Bayou Boeuf is critical to identify the real source area of pollution in waters received at Port Barre.

In conclusion, the principal investigator suggests that water samples over a period of 6 to 12 months should be collected at several locations along Bayou Wauksha, Bayou Boeuf, and Bayou Cocodrie. Results from the field sampling will be critically helpful for developing a feasible, targeted implementation plan for this watershed.

## ***A Comprehensive Strategy for Implementing Best Management Practices to Improve the Quantity and Quality of Storm Water Entering the Vermilion River***

The Lafayette Parish Bayou Vermilion District (BVD) initiated this project in the summer of 2008. One of the goals of BVD is to actively participate in the preservation and restoration of our environmental resources within the Vermilion-Teche watershed. The primary waterway within the watershed is the Bayou Vermilion. The purpose of this grant is to develop and implement best management practices to improve the quantity and quality of storm water which makes its way into rivers and waterways.

This project has four primary goals. The first goal is to reduce the volume of storm water runoff through infiltration, retention, and evaporation. The second goal is to improve the quality of storm water runoff through the creation of infiltration sites on previously impervious surfaces. The third goal is to stop the treatment of rain water as a waste product and instead find beneficial uses for this free resource. The final goal is to raise public awareness about best management practices which are known to reduce storm water quantity and improve storm

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water quality, as well as educating the public about different types of wetland plants and their beneficial uses. The following details the accomplishments of the project over the past year.

One objective of the project is to create a wetland plant propagation nursery with both a greenhouse and a wetland plant demonstration area. A floor plan and sketch of the nursery has been generated. The foundation for the nursery has been constructed. Suitable fill material was added to the foundation. The top 6 inches of the nursery floor has been laid with limestone and siltstone aggregates in order to allow drainage while watering. A trench was constructed from the primary power source to the nursery's location and electrical and water lines have been laid to the building's north wall. All of the water hyacinths from the adjacent wetlands demonstration area have been removed. These hyacinths are being composted for use in the nursery. Invasive trees and plants from the wetlands have been eradicated from the plant demonstration area.

A second objective is to design and construct an interactive demonstration rain garden. To prepare the location for construction, all invasive Chinese Tallow trees, rotten logs and low-hanging branches found in the rain garden area and the adjoining Petite Bayou were removed. A preliminary design was generated and preparations were made to begin construction. A portion of the parking and sub-surface soil cement was cut, broken up and removed. Sediment was removed from the Petite Bayou wetland adjacent to the rain garden in order to increase its water holding capacity and restore its function as a stormwater runoff drain. An estimated 375 cubic yards of sediment was removed from the channel. Aggregate and organic material has been gathered for this project and stockpiled for future use in the rain garden. The limits of the rain garden's boundaries were determined and marked by pin flags set at regular intervals along the rain garden's excavation perimeter. Several survey elevation shots were taken to establish a consistent gradient throughout the construction area in order to insure uniform drainage and filtration throughout the rain garden.

The construction and design of a demonstration site of pervious pavement parking surfaces is also a part of this project. The location for the demonstration area has been chosen and currently serves as an overflow parking lot. This area of the parking lot has a history of some minor flooding during periods of heavy rain. The improvements made to the Bayou Petite and the addition of pervious pavements in this location should alleviate the flooding. Research has been conducted concerning the different types of pervious pavement and the benefits and limitations of each design in order to ascertain which 3 examples will be best suited for the area. The construction and distribution of 100 rain barrels to the public is also an objective of this project. Three different "Build Your Own Rain Barrel" workshops were established and made available to the public in order to construct and distribute the rain barrels. The workshops lasted one and a half to two hours and were held on Saturdays. Additionally, barrels were distributed at the Lafayette Middle School Earth Day Celebration. During each workshop, participants were given a 15 minute description of this storm water grant, why it is important to the water quality of the Bayou Vermilion, and how the materials were paid for. Participants were walked through the process of constructing the barrels. The participants were able to leave the workshop with a completed rain barrel, ready to be set up within 24 hours. To date, 75 of the 100 rain barrels have been constructed and distributed through 4 different events.

A final objective of the project is to improve an existing detention pond through increased bio-retention. The water hyacinths that covered the entire surface of the pond were physically



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removed from the pond. Once a large portion of the hyacinths were removed, booms were installed to prevent remaining colonies from re-infesting previously cleared areas. The water hyacinths which were removed from the detention pond have been composted for use in the wetlands plant propagation nursery. Chinese Tallow trees along the banks were also removed. Once the surface of the pond was cleared of water hyacinths, bathymetric profiles were generated to graph contours of the bottom of the pond and calculate its depth. It was discovered that while the edges of the pond were relatively shallow, they are too steep to provide a suitable habitat for fish propagation, so sediment from the pond was excavated from the bottom away from the edge and placed inside the pond along the bank to create these fish propagation zones, and for planting wetland and aquatic vegetation. Already, as a result of the project, the detention pond is showing evidence of being re-habilitated. Before the removal efforts, the pond was completely covered with water hyacinths and most other forms of life had been crowded out. The water is now capable of supporting aquatic flora and fauna again. The riparian zones created along the sides of the bank will serve as habitat for native grasses and vegetation as well as spawning sites for fish.



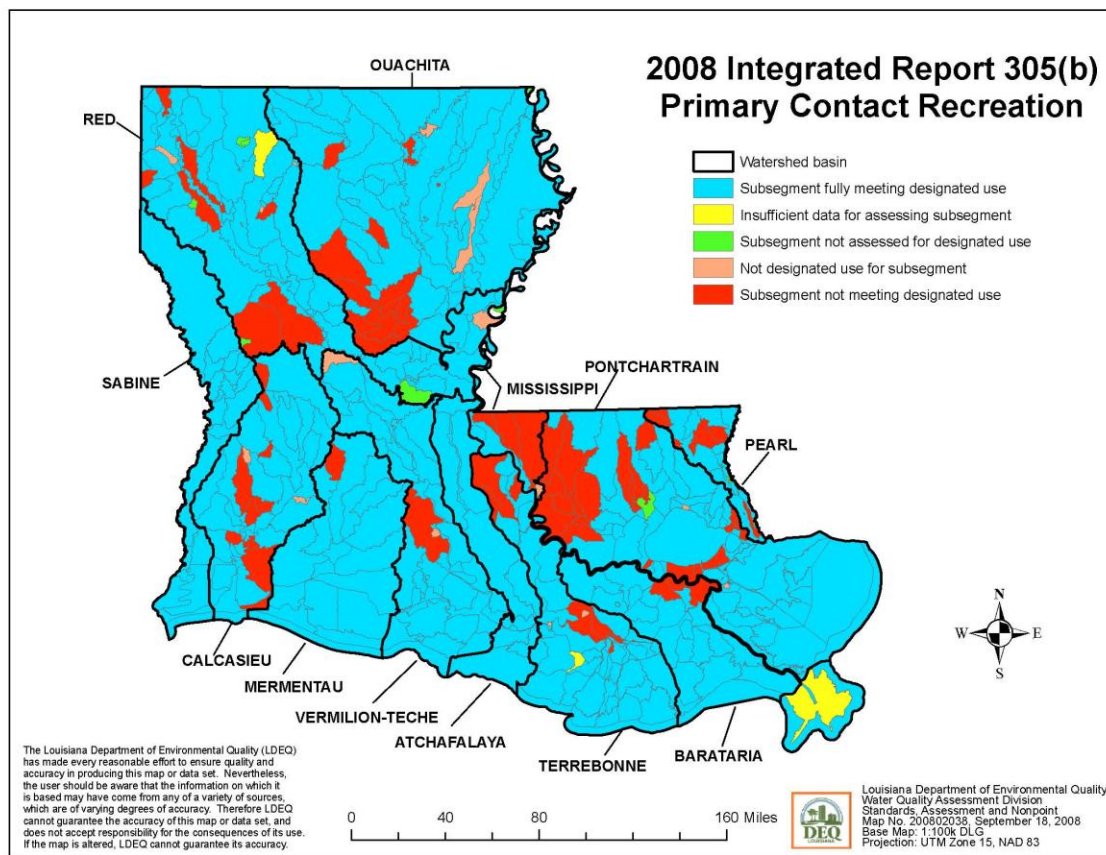
# *Implementation and Improvement*

## USDA and SWCD Programs

During FY 2009, the USDA implemented approximately 14,638 acres of BMPs within the Vermilion-Teche River Basin through the EQIP. An additional 422 acres of practices were implemented through the CRP, 831 acres of practices were implemented through the WRP, and 506 acres of practices were implemented through the WHIP.

# Implementation and Improvement

## Statewide



In addition to nonpoint source projects that have been targeted at the watershed level, there have also been programs implemented during 2009 to address nonpoint source concerns on a statewide scale. This allows progress to be made across the state rather than only in targeted watersheds. The NPS Management Plan also included tasks and milestones for implementation of statewide programs for agriculture, forestry, urban runoff, home sewage, hydromodification, construction and resource extraction. During 2009, LDEQ has worked with many entities to make progress in implementing the statewide NPS Programs.

### ***Model Landscape Code Design Standards: A Technical Document for Designers and Developers***

Nonpoint source pollution (NPS) is associated with urban runoff from land use activities along with disturbances from construction and yard and garden maintenance activities. Urban runoff is a most perplexing form of nonpoint pollution simply because of the many land uses. Each land use may introduce a different form of pollution that finds its way into a community's centralized storm water system where it is all mixed together and transported to fresh water bodies. Types of NPS pollutants from urban activities include sediments, nutrients, pesticides, metals, salts, and other inorganic and organic substances that can enter surface or groundwater.



# Implementation and Improvement

Many of these pollutants can be captured upstream at their source and better managed on urban development sites. But to do this, public ordinances are required to induce better on-site storm water site planning. If on-site storm water management practices are regulated and are used by architects, landscape architects, and engineers who build cities, then consequently less non-point pollutants will find their way downstream.

One way to solve this problem is to develop a community landscape code that requires storm water runoff to be treated where it falls. To treat storm water where it meets the ground can reduce nonpoint pollution conveyed by runoff before it enters the storm water train on its way to the sea. A community landscape code is an ideal tool to treat storm water by simply holding part of all rainfall on the site where it originates.

To help restore and protect local receiving streams from nonpoint source water pollution, the LDEQ NPS Program by contract with Abbey Associates, Inc. has developed a *Model Landscape Code* designed specifically for Louisiana's unique environment. The Model Code is a tool that will be made available to municipalities, parishes, developers, landscapers, and the public as a guide for environmentally friendly landscaping.

The overall goal of this project was to provide technical design standards for landscaping, on-site storm water management, irrigation, and habitat preservation for any community wishing to adapt the State of Louisiana Model Landscape Code to local conditions. The objective of the project was to prepare a set of specific landscaping design guidelines and locally adjusted BMPs in written, graphic and digital format to be used by designers, builders, developers and public officials to protect public waters while reducing site runoff. Both the goal and objective were accomplished.

The document has been completed and explains to users of the Model Code, in technical language and drawings, how they may adjust the baseline design standards in the code to meet community needs by recalculating the formulas and the design decisions used to determine the spatial, linear, volume and unit values of the water or vegetation that is central to the use of the model code. Simply put, this work allows code adaptors to adjust the code requirements for BMPs, parking lots, street buffers, rain gardens, planted buffers and other landscaping and water management elements of the Model Code to meet their community needs while still maintaining the intent of the code, which is to reduce nonpoint pollution coming out of urban areas.

The deliverables submitted for each task fit the objectives that the project set out to achieve in the beginning: The website is up and running and can be viewed at <http://www.abbey-associates.com/splash-splash/>. LDEQ has multiple copies of the model landscape code CD, which contains the original files of the project. The "Technical Design Standards" have been compiled, and the fact sheets have been completed. There was a Peer Review and Analysis of Content task, in which a draft copy of the document and fact sheets were mailed to landscape code administrators across the country, to ensure the accuracy, conformity, and readability of the proposed palette of design standards. The peer review by outside administrators confirmed the quality of the definitions, specifications, descriptive drawings, formula and quantity measures illustrated on the specimen Design Standards for storm water management and landscaping as shown on the Fact Sheets. Another aspect of this project was the development of

# *Implementation and Improvement*

digital materials and a web site, and that can assist as a supplemental educational program for this project. The web site provides general and technical information about this project and the design standards that have been created. The website also contains the Design Standard Fact Sheets, a slide show of examples, technical drawings, technical definitions, specifications and quantity measure formulas and appeals to several audiences including public officials, developers, engineers, architects and landscape architects, researchers and students.

This project is a huge step in the right direction. LDEQ would like to eventually see the types of storm water BMPs that are described in the document actually implemented in most of our cities and communities in Louisiana. We believe that once people see the benefits of these designs and how beautiful they are, they will begin to use them in their residential, industrial and commercial developments. They add a whole new dimension to how storm water can be managed within an urban setting.

As a result of this project, all of the technical information concerning the Model Landscape Code Design Standards is in one place and is presented in a manner that should be useful for landscape architects and builders across our state. A link to the Splash-Splash website will be posted on the NPS website and will also be shared with our Small Business Assistance Program and our storm water permit program. LDEQ is hopeful that this project will continue to help implement the urban runoff and construction educational goals of the Louisiana Nonpoint Source Management Plan by helping to continue to enhance the knowledge and utilization of BMPs among developers, architects, engineers, and researchers and students.

## ***Louisiana Forestry Best Management Practices Education Project, Phase 2***

Forestry in Louisiana continues to provide timber as a primary export crop for the state, and agricultural land use in Louisiana is dominated by forestry. According to the 2000 305(b) Report, forestry is responsible for the impairment of approximately 286 stream miles of rivers. The 2000 NPS Management Plan includes goals “to reduce the concentration of sediment, nutrients, and total organic carbon in areas of the state where forestry activities have been indicated as one contributing source of non point source pollution”. The importance of establishing and implementing a code of Best Management Practices (BMPs) is indisputable. The Forestry agencies of Louisiana are unable to keep up with the demand for information on Forestry BMPs, which is currently available in leaflet form. The LSU Agricultural Center proposed the synthesis of a web site and DVD dealing specifically with Louisiana State Forestry BMPs to be made available to all stakeholders and the general public. The project also incorporated workshops to raise awareness among stakeholders, particularly clientele from the logging sector, regarding the existence and uses of the website and DVD.

The overall goal of the project was to establish and maintain an online education resource dealing with Best Management Practices for Forestry management. The aim was to educate a diverse audience of loggers, foresters, forest industry leaders, non-industrial private forest landowners, educators, other interested stakeholders, and the general public. The specific objectives were to 1) develop a website that encompassed the content contained in the publication “Recommended Forestry Best Management Practices for Louisiana”, 2) create a field video of BMP implementation and practices to be included in the website, 3) develop a DVD of the BMP video that would serve as a stand-alone product as well as a companion to the website, and 4) hold workshops to advertise and explain the website and DVD to stakeholders around

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the state. The website that was created can be viewed at [http://www.lsuagcenter.com/en/environment/forestry/forestry\\_bmps/](http://www.lsuagcenter.com/en/environment/forestry/forestry_bmps/).

The deliverables submitted for each task fit the objectives that the project set out to achieve in the beginning: The website is up and running; DVDs were mailed to stakeholder groups, including the following: 1) One copy to each person who has requested it during the BMP meetings, approximately 125 copies 2) One copy each to all Master Loggers (through the Louisiana Logging Council), approximately 1,200 copies 3) Approximately 200 copies to each of the Area Forestry Agents in the different regions of the state, approximately 1,000 4) Approximately 1,000 copies went to the Louisiana Forestry Association for widespread distribution 5) Approximately 200 copies for the Southern Region Extension Forester's office, for distribution to extension specialists around the South 6) Approximately 4,000 copies kept in inventory for distribution as situations arise, or as needed; therefore, total production was approximately 7,525 copies.

As a result of this project, the Louisiana Forestry Best Management Practice Manual has been digitized, which allows forestry BMP information to be more accessible and user friendly to those in the forestry industry. The DVDs that were produced provides on the ground demonstrations of forestry BMPs and can be mailed to any person who desires more information. The forestry workshops were a success and resulted in more than 200 foresters, loggers, and landowners being trained on streamside management zones, forestry road construction, site preparation, timber harvesting practices, etc. LDEQ is hopeful that this project will continue to help implement the forestry educational goals of the Louisiana Nonpoint Source Management Plan, by helping to continue to enhance the knowledge and utilization of BMPs among loggers, landowners, and foresters.





# *Implementation and Improvement*

## *Standards Development for Nutrient Criteria for Wetlands*

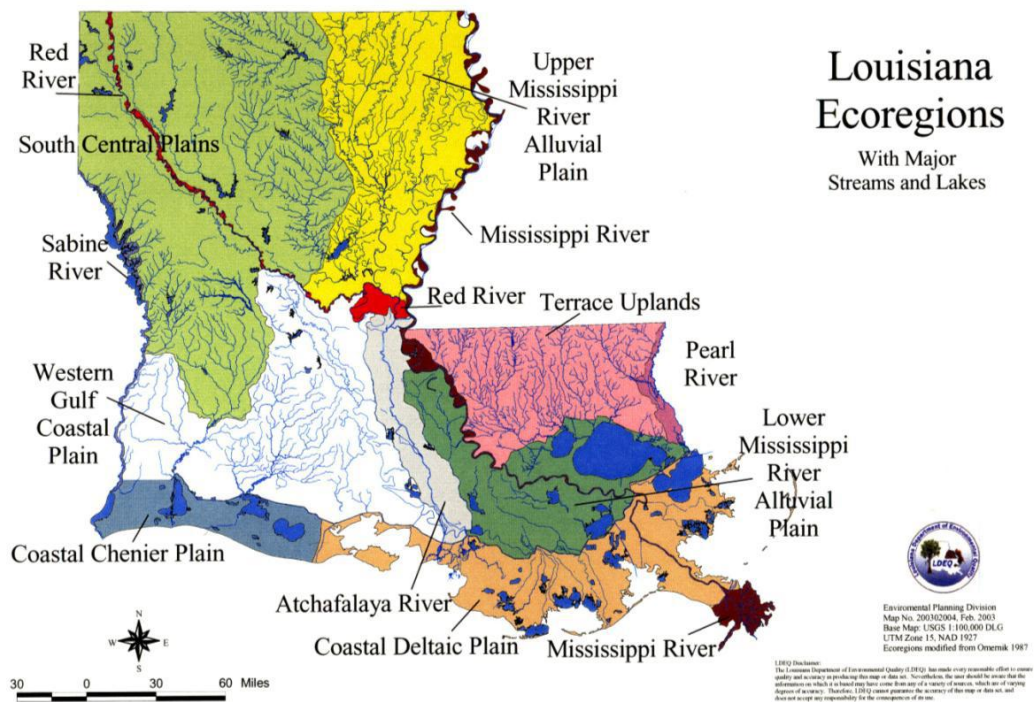
This project started in 2008 and is currently in progress. EPA has required that States develop numerical criteria for nutrients in surface waters of the United States. In an effort to develop regionally based water quality criteria for Louisiana, LDEQ began establishing an ecoregional framework for surface water standards. To develop numerical criteria for freshwater wetlands in Louisiana, both ecoregion and wetland classifications will be considered. A classification scheme can be used to provide a common framework for the development of nutrient criteria within a group of similar wetlands. Thus, within the ecoregion framework, wetlands will be classified and examined for functional similarities or differences.

The goal of this project is to develop nutrient criteria for freshwater wetlands within Louisiana. The following specific tasks will assist in this goal:

- Review an existing wetland classification scheme for wetlands within Louisiana and modify, if necessary, for use in developing nutrient criteria in wetlands. Identify wetland characteristics that may influence nutrient assimilation efficiency.
- Gather and review existing data for nutrient assimilative capacity, response to nutrient loading rates, nutrient fate (e.g., denitrification, permanent burial), and other variables, including seasonal relationships, relevant to nutrients in wetlands. Identify data gaps and areas of future research.
- Identify or develop a procedure to determine best attainable conditions for each wetland classification.
- Determine appropriate parameters for monitoring and assessing wetland response to nutrients.
- Conduct a statistical analysis of data to develop best attainable nutrient conditions in each class of wetland.
- Develop options for prototype nutrient criteria for classified freshwater wetlands in Louisiana for consideration by LDEQ.

Nutrients in surface water have been analyzed for best attainable conditions. Data have been analyzed for forested wetlands and marshes to determine best attainable conditions for surface water total nitrogen and total phosphorus. Statistics have been conducted and data have been summarized for best attainable conditions in forested and herbaceous wetlands. A manuscript of the data is also in preparation. The draft data report has been written and was submitted to DEQ in April 2009. A no-cost time extension was needed primarily because the search for data took a lot longer than expected (because so few water quality data exist for many types of freshwater wetlands in Louisiana). The new project completion date is September 30, 2010.

# Implementation and Improvement



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## USDA Programs

Throughout the state of Louisiana, the USDA implemented approximately 17,113 acres of BMPs through the CRP, 8,050 acres through the WRP, 199,709 through the EQIP, and 10,598 acres through the WHIP. The following chart shows approximately the total number of acres of implemented BMPs per basin.

<b>Basin</b>	<b>Acres of USDA Implemented BMPs</b>
Barataria	3,199
Calcasieu	13,171
Mermentau	32,921
Mississippi	1,419
Ouachita	96,996
Pearl	1,453
Pontchartrain	13,190
Red	37,737
Sabine	4,164
Terrebonne	14,823
Vermilion-Teche	16,397



# Source Water Protection Program

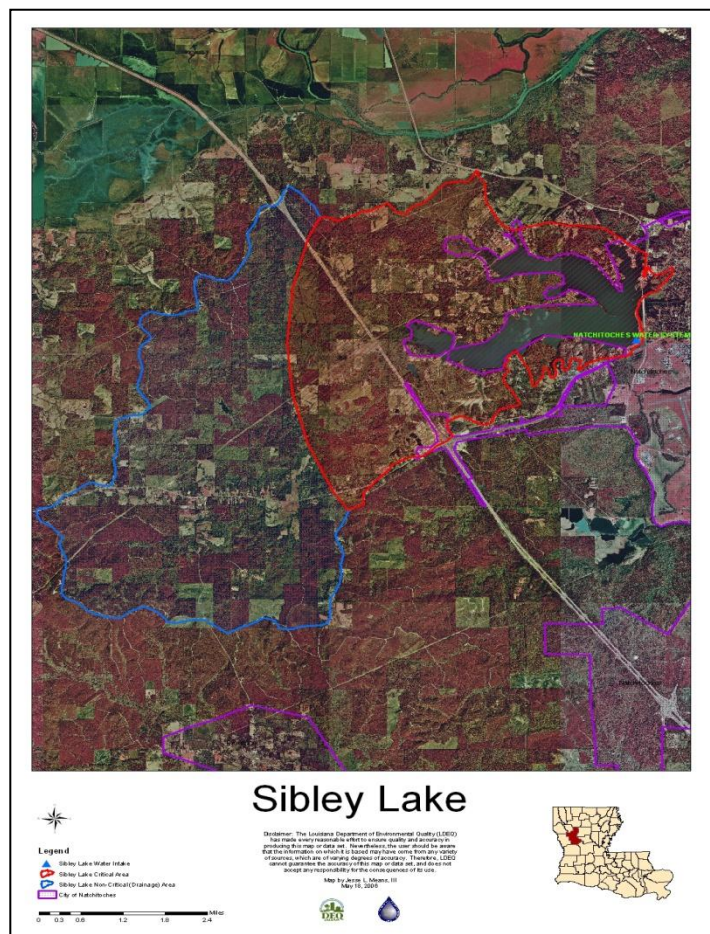
## Source Water Protection Program Work in Natchitoches Parish

### *Sibley Lake Watershed Individual Sewage Treatment System Improvement Project*

This is a current example of one way LDEQ addresses specific nonpoint sources of contamination around a water source. Located in the Red River Basin in Natchitoches Parish, Sibley Lake is the drinking water supply for the City of Natchitoches, the Village of Clarence, and the community of Hagewood. It is also the water supply for the unincorporated areas around the lake and along the water distribution system between the above listed municipalities. The total population served is almost 25,000. The critical watershed drainage area (a maximum of 5 miles upstream from the intake) is outlined in red on the map at right. The area in blue represents the lake's total watershed. The watershed surrounding the lake consists of urban and rural land. The area immediately surrounding the lake has a significant amount of residential development and most of this development is located outside the corporate limits for the City of Natchitoches. On the map, the corporate limits of the City of Natchitoches are shown in purple. Because most of this development is located outside the municipal limit, no centralized sewage system exists there, and therefore it is served by individual sewage treatment systems. These sewage treatment systems are in varying degrees of operational condition. Many of these systems are located within only a few hundred feet of the lake or its tributaries. Development of the property directly adjacent to and around the lake is expected to continue, which will increase the potential for sewage loading going into the lake.

LDEQ worked with the City of Natchitoches to protect their water source. As part of this effort, the City of Natchitoches, with LDEQ's encouragement and assistance, submitted a proposal for the Sibley Lake Watershed Individual Sewage Treatment System Improvement Project and it was approved by the Louisiana Office of Contractual Review. The project became effective on May 1, 2007, was to terminate on October 31, 2008, but was extended to October 31, 2009.

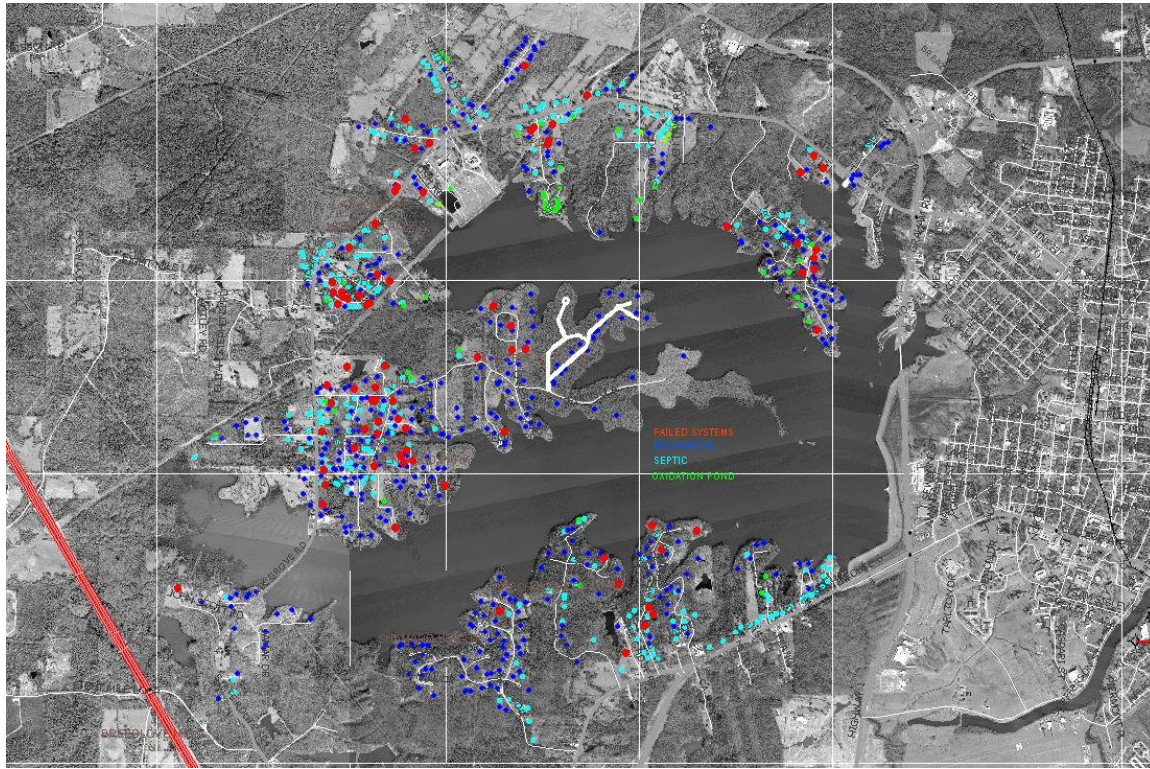
The 319-funded project enabled the City of Natchitoches to inventory and inspect all individual sewage treatment systems within a half-mile of Sibley Lake, and, to the extent permitted by time and funding, additional areas beyond a half-mile which are immediately adjacent to tributaries. As part of the project, these systems were located by GPS and all pertinent information on each system was entered into the city's GIS System. Owners of failing individual sewage treatment units were served notice that their systems must



# Source Water Protection Program

be repaired or replaced. Funding was provided for the repair/replacement of failed systems on a cost-share basis. Owners of repaired/replaced systems were required to sign a document stating that they will abide by continued maintenance requirements for as long as they own the repaired/replaced system. This project enabled the City of Natchitoches to mitigate the future threat of sewage loading in Sibley Lake and protect their source of drinking water and the health of those that swim and boat in the lake.

The following is a map of the mechanical plants, septic systems, and oxidation/other sewage systems surrounding Sibley Lake that were inventoried during the project.



The steps in which money was paid out for the repair/replacement of malfunctioning systems are as follows: Once a job was complete, the vendor notified the Louisiana Department of Health and Hospitals, a representative of which then inspected the system and sent a letter to the contractor along with the permit for the system and the invoice. The contractor only paid money out after this last step was complete. One last thing of note is that the contractor was contacted by someone representing the University of Georgia who is interested in performing a similar project for a community in the state of Georgia.

The contractor used a total of \$225,691.10 of the \$226,000.00 allocated to this project. A total of 818 individual sewage treatment systems were inspected. Of this amount, 171 were determined to be failed and 147 of those systems were repaired or replaced.



# Source Water Protection Program

## Source Water Protection Program Work in Assumption, Lafourche, and Terrebonne Parishes

### Bayou Lafourche Fecal Coliform Sources Project

A public education campaign was launched for Assumption, Lafourche, and Terrebonne Parishes and four community meetings were held in the area. A source water protection committee was formed for these three parishes which are located within the Barataria and Terrebonne Basins. Bayou Lafourche, which flows from the Mississippi River at Donaldsonville (in Ascension Parish) through Assumption and Lafourche Parishes from north to south toward the Gulf of Mexico, is a major source of drinking water for the entire area. It is the source of drinking water for every public water system in both Assumption and Lafourche Parishes and also for one of the public water systems in Terrebonne Parish. The remaining water systems in Terrebonne Parish also use water from Bayou Lafourche to blend with their existing water sources whenever those sources receive too much salt water from the Gulf of Mexico.



Algae in Bayou Lafourche

LDEQ's sampling efforts show that where Bayou Lafourche is a drinking water source, it is not meeting its primary contact recreation (swimming) and fish and wildlife propagation (fishing) designated uses. Dissolved oxygen and total fecal coliform criteria are not being met. Further downstream, toward the Gulf of Mexico, where the bayou is not a drinking water source, it isn't meeting its fish and wildlife or its oyster propagation designated uses. The dissolved oxygen criterion is not being met. These sampling results highlight a problem of sewage loading in the bayou.

The LDEQ contractor (Nicholls State University) monitored selected sample sites which point to the sources of fecal coliform contamination in Bayou Lafourche. The contractor indicated that the highest levels of fecal coliform are expected in the summer months. This was observed in some sites which had a constant supply of water. However, there was also a drought for part of the sampling time, and the ditches and storm drains where some of the sample sites are located were dry and therefore a sample could not be obtained at these locations. As has been the case throughout this project, various sample locations exhibited various levels of fecal coliform, some of which exceeded primary contact recreation standards (200 MPN FC/100 ml) and some of which exceeded the secondary contact recreation and the water quality standard for drinking water supplies of 2,000 MPN fecal FC/100 ml. As is the routine, the laboratory analysis was conducted immediately after the samples were collected. The data collected from this project is being used by LDEQ to help target the sources of fecal coliform as indicated by consistent high readings (hot spots). Louisiana Department of Health and Hospitals (LDHH) has been contacted to address individual home treatment systems. LDEQ has met with LDHH to present the findings and has given LDHH the sample locations that the study identified as exhibiting fecal coliform from human sources. LDEQ will work with LDHH to pinpoint exactly which residences are contributing fecal coliform in the near future. The data has also been used to identify sources of fecal coliform that LDEQ can address through its wastewater permitting system. Additional plans include working with local government on the passage of an

# Source Water Protection Program

ordinance to address malfunctioning sewage systems, consolidation of individual sewage treatment systems, public education, and the promotion of best management practices. The final report was approved in a letter from EPA dated December 10, 2009.

## *Source Water Protection Program Work in Grant Parish*

### *Big Creek Fecal Coliform Sources Project*

Big Creek, which is a source of drinking water for people in southern Grant Parish and northern Rapides Parish, is not meeting the fecal coliform standard necessary to support its designated use for primary contact recreation (swimming). Reasons cited for this in DEQ's 2008 Integrated Report are livestock (grazing or feeding operations) and sewage discharges in unsewered areas. Because Big Creek is a drinking water source and an outstanding natural resource, it is in the public interest to determine what is contributing fecal coliform bacteria to the creek. Therefore, DEQ contracted with the University of Louisiana Monroe to conduct a sampling program to study the sources of the fecal coliform. Dr. Kevin Baer, Associate Professor of Toxicology, was the lead for this project.

A quarterly site visit for this project was held on May 14, 2009. The site visit included a complete surveillance of all sampling sites as well as further investigation at potential "hotspot," site #6. Samples were taken and optical brightener readings were recorded at four new sample locations. The main goal of the site visit was to evaluate the sampling locations and results. Additionally, the site visit found that sampling/analysis was performed satisfactorily and is being carried out according to the contractor's schedule. Following the site visit, recommendations on site eliminations and additions were made by Dr. Baer. The site revisions were accepted under conditions as documented by e-mail, dated 5/18/2009.

The draft of the third quarterly report for this project covering April through June, 2009 was received on July 4, 2009. During this quarter, six non-rain sampling events and one site survey were conducted. Here are some excerpts from the report:

*After the site survey with LDEQ project manager, Micaela Coner, a revised sampling strategy was developed to target areas of high fecal coliform levels. Orthophosphate and optical brightener (OB) units were generally low at all sites. Although decreases were observed in several optical brightener units following exposure to UV light, there does not appear to be a correlation between high fecal levels and decreases in OB units following UV exposure (indicating natural organic matter). These changes may also be due to a lack of sensitivity/reproducibility of measurements at these low OB levels (i.e., a standard value of 1.00 is equal to a 0.0005% Tide solution).*

*Sampling results indicate consistently high fecal coliform levels in Site 6 (Sugar Branch at Hwy 165). As a result, a site survey of this creek was conducted on May 5, 2009. The creek was behind several trailer homes and drainage ditches or seepage fields were observed coming from these locations. Selected areas behind the trailer homes were sampled for fecal and total coliforms and results indicated high levels coming from these areas. These sites, especially Site 6d, showed elevated levels of fecal coliforms in the subsequent sampling events. Since this ditch appeared to originate on private property, no additional surveillance was conducted.*



# *Source Water Protection Program*

As a result of this project elevated levels of fecal coliform were measured from drainage ditches originating behind residential trailer homes at sites 6a and 6d. As determined by the Project Investigator, these levels may be due to faulty sewage systems or natural sources (i.e. soil bacteria and/or indigenous wildlife). During rain events, several areas adjacent to pasture land were identified that may contribute to elevated fecal coliform levels in Big Creek. The Louisiana Department of Environmental Quality has coordinated with the Louisiana Department of Health and Hospitals (LDHH) regarding sites 6a and 6d. It is under the authority of LDHH to investigate the residential trailer homes to ensure that their wastewater disposal systems are functioning properly. Fecal coliform loading at identified hot spots adjacent to pasture land will be investigated further by the Clean Waters Program Watershed Coordinator for that area. The final report has been sent to the Watershed Coordinator for the Big Creek area so that she is aware of the sites that need educational outreach and BMP implementation. After BMP implementation, additional sampling at key points should be conducted in the future to determine water quality improvement. Sites where high fecal coliforms have been found without an obvious potential source have been attributed to wildlife in the forest and natural causes.

In addition to this project, representatives of LDEQ's regional office in Pineville are working on a concentrated inspection process for the Big Creek watershed to be sure there is complete compliance with LDEQ's permitting system in the area. The final report for this project was submitted on September 14, 2009 and has been approved by EPA.

## *Source Water Protection Program Work in Ouachita Parish*

The Louisiana Department of Environmental Quality's Drinking Water Protection Team visited with representatives of the local water systems and other government officials to introduce the Drinking Water Protection Program. Ouachita Parish has forty-five (45) active public community water systems. There is one surface water system and five water systems that purchase surface water. The surface water system is the City of Monroe and the sources of drinking water are the Ouachita River and Bayou Desiard. There are thirty-six (36) ground water systems, and three systems that purchase ground water. These numbers may change as the parish adapts a plan for the residents of Ouachita Parish. All residents on the east side of the river will use surface water, and all residents on the west side of the river will use ground water sources. The main aquifer for the parish is the Sparta Aquifer.

In this reporting period the Ouachita Parish Drinking Water Protection Committee held its final meeting on April 30<sup>th</sup>, 2009. Ann Wilson with the City of Alexandria gave a presentation on household hazardous materials collection days. Ann spoke about how they got started, how to conduct a collection day and what she has learned from her hands-on experience. DEQ provides funding for collection days from the fines collected for certain enforcement actions. A "Request for Proposals" (RFP) goes out periodically as money becomes available. The committee expressed interest in putting a collection day together for Ouachita Parish but wants to see one in action first. The printed fact sheet for construction contractors was handed out for distribution. Some of the fact sheets were given out to be distributed to ULM's contractor's class. Additionally, the Home Builders Association of Northeast Louisiana distributed 400 copies as inserts in their newsletter. The Committee also discussed distribution of the lawn and garden factsheet.

# *Source Water Protection Program*

The model ground water well protection ordinance was introduced to the Town of Sterlington, West Monroe, and the Ouachita Parish Police Jury. The City of West Monroe adopted the ordinance. The Town of Sterlington declined the ordinance. The Ouachita Parish Police Jury declined the ordinance due to a statute for Ouachita Parish whereby the Police Jury cannot change a land use without a positive vote from the public.

All of the visits to potential sources of contamination have been completed through a combined effort of various Committee members and DEQ.

## *Source Water Protection Program Work in Calcasieu Parish*

The Louisiana Department of Environmental Quality's Drinking Water Protection Team began work in Calcasieu Parish in June 2008. Staff members visited with representatives of the local water systems and other government officials to introduce the Drinking Water Protection Program. Calcasieu Parish has fifteen active public community water systems, including the City of Lake Charles which serves a population of 80,000. All of the systems are ground water systems. A community meeting to introduce the program to the public and solicit volunteers to form a committee was held on August 14, 2008. Twenty-four people attended the meeting and twelve people volunteered to join the committee. The committee orientation meeting was originally scheduled to be held in September but was postponed due to hurricane recovery activities following Hurricanes Gustav and Ike. The meeting was rescheduled for October 30, 2008. The paragraphs below report on the activities for this reporting period.

The committee met on April 23, 2009 for a presentation on the Louisiana Nonpoint Source Pollution Program given by Christy Rando from LDEQ. Committee members also completed their used oil recyclers list, which also included facilities that accept antifreeze, batteries and mercury for recycling and/or disposal. LDEQ printed 5000 copies of the list to be distributed throughout the community, especially to local businesses who sell motor oil.

The committee met on May 21, 2009 in DeRidder, LA as part of a combined tri-parish committee meeting to host a guest speaker. The parishes included Calcasieu, Beauregard, and Vernon. Brad Hanson from the Louisiana Department of Transportation and Development gave a presentation on the proper plugging and abandonment of water wells, especially domestic wells.

The committee met on June 11, 2009 for their final meeting. Rusty Reeves from the Louisiana Rural Water Association gave a presentation on backflow prevention and cross connection control. Following the presentation the committee members were presented with certificates of appreciation for their service on the committee.

The City of Westlake and the City of DeQuincy passed the groundwater protection ordinance in order to protect their sources of drinking water. The ordinance is currently under consideration by the City of Lake Charles.

All visits to significant potential sources of contamination in Calcasieu Parish are complete. Contingency plans for all water systems in the parish have also been completed.

# *Source Water Protection Program*

## *Source Water Protection Program Work in Beauregard Parish*

The Louisiana Department of Environmental Quality's Drinking Water Protection Team began work in Beauregard Parish in November 2008. Staff members visited with representatives of the local water systems and other government officials to introduce the Drinking Water Protection Program. Beauregard Parish has six active public community water systems. All of the systems are ground water systems. A community meeting to introduce the program to the public and solicit volunteers to form a committee was held on December 4, 2008. Ten people attended the meeting and five people volunteered to join the committee. Below is a reporting of the activities in this parish during this reporting period.

The committee met on April 30, 2009 to discuss progress on passage of the drinking water protection ordinance. Committee members, along with a member of the LDEQ Drinking Water Protection Team, had been attending Police Jury meetings in an effort to get the ordinance passed to protect public supply wells outside of city limits.

The committee met on May 21, 2009 in DeRidder, LA as part of a combined tri-parish committee meeting to host a guest speaker. The parishes included Calcasieu, Beauregard, and Vernon. Brad Hanson from the Louisiana Department of Transportation and Development gave a presentation on the proper plugging and abandonment of water wells, especially domestic wells.

The committee met on June 25, 2009 to continue discussion of progress on the ordinance with the Police Jury. At the time of this meeting, the ordinance had gone out for public comment in July and would be on the agenda for a vote in August. An LDEQ Drinking Water Protection Team member planned to attend the August Police Jury meeting, along with members of the committee and water system board members and operators. A presentation of the aquifers of Beauregard Parish was given by Rob Fendick from the U.S.G.S. Following the presentation the committee members were presented with certificates of appreciation for their service on the committee.

All visits to significant potential sources of contamination in Beauregard Parish are complete. Contingency plans for all water systems in the parish have also been completed. The City of DeRidder adopted the ordinance in December 2008. The Town of Merryville adopted the ordinance in May 2009.

## *Source Water Protection Program Work in Vernon Parish*

The Louisiana Department of Environmental Quality's Drinking Water Protection Team began work in Vernon Parish in January 2009. Staff members visited with representatives of the local water systems and other government officials to introduce the Drinking Water Protection Program. Vernon Parish has sixteen active public community water systems. All of the systems are ground water systems. One system is a purchasing system and three of the sixteen systems serve the U.S. Army Joint Readiness Training Center and Fort Polk. A community meeting to introduce the program to the public and solicit volunteers to form a committee was held on February 19, 2009. Nine people attended the meeting and seven people volunteered to join the



# *Source Water Protection Program*

committee. At the end of the quarter the committee has 21 members. The paragraphs below report on activities in this parish during this reporting period.

The committee met on April 16, 2009 for a presentation on the model ground water protection ordinance. They also discussed their progress on visits to significant potential sources of contamination (SPSOC). Visits in two towns were completed.

The committee met on May 21, 2009 in DeRidder, LA as part of a combined tri-parish committee meeting to host a guest speaker. The parishes included Calcasieu, Beauregard, and Vernon. Brad Hanson from the Louisiana Department of Transportation and Development gave a presentation on the proper plugging and abandonment of water wells, especially domestic wells.

The committee met on June 18, 2009 to discuss progress on SPSOC visits and passage of the drinking water protection ordinance. They also discussed the development of a used oil recyclers list for the parish. Once completed, the list will be published in newspapers and will be distributed to local businesses who sell motor oil. It will also be distributed at the annual household hazardous materials collection day. The committee also discussed inviting guest speakers to give presentations on topics of interest. These include nonpoint source pollution with emphasis on forestry best management practices and cross connection control/backflow prevention.

The committee met on August 20, 2009 to discuss progress on SPSOC visits and the used oil recyclers list for the parish. Tony Duplichin from the Louisiana Department of Natural Resources gave a presentation on the Louisiana Ground Water Resources Program, which includes new registration requirements for water wells.

The committee met on September 24, 2009 for their final meeting. Visits to SPSOCs are now complete and the used oil recyclers list is complete. LDEQ compiled the list for printing. It was published in newspapers and was distributed to local businesses who sell motor oil. It was also distributed at the annual household hazardous materials collection day. Jan Boydstun from the LDEQ Nonpoint Source Pollution Section gave a presentation on the Louisiana Nonpoint Source Pollution Program with emphasis on forestry best management practices, as requested by the committee. Following the presentation the committee members were presented with certificates of appreciation for their service on the committee.

The ordinance was introduced to all mayors in the parish and to the police jury for consideration. The Town of Hornbeck adopted the ordinance in April 2009. The Town of Anacoco adopted the ordinance in May 2009. The ordinance was adopted by the Vernon Parish Police Jury and the City of Leesville in August 2009 and by the Towns of Rosepine and Simpson in September 2009. Visits to significant potential sources of contamination are complete. Contingency plans for all water systems have been completed, including the three systems contained within Fort Polk.

# *Source Water Protection Program*

## *Source Water Protection Program Work in LaSalle Parish*

The LDEQ Drinking Water Protection Team began work in LaSalle Parish in July 2009. Staff members visited with representatives of the local water systems and other government officials to introduce the Drinking Water Protection Program. LaSalle Parish has sixteen active public community water systems. All of the systems are ground water systems. Four systems are purchasing systems. A community meeting to introduce the program to the public and solicit volunteers to form a committee was held on August 13, 2009. Ten people attended the meeting and all ten of them volunteered to join the committee.

The committee held its first meeting on September 17, 2009. It was an orientation meeting conducted by the LDEQ Drinking Water Protection Team to discuss the goals of the committee and any specific environmental concerns they have. The committee elected Jena Water Superintendent Don Jones as the committee chairman and Margaret Rogers from the Town of Tullos as the secretary. The committee decided to begin their first project, visits to the owners/operators of significant potential sources of contamination, at the beginning of the next quarter.

## *Source Water Protection Program Work in Caddo Parish*

During August 2009, LDEQ began Drinking Water Protection activities in Caddo Parish. To start off, all the water systems were visited to get them interested in the program, to gather other contacts, and to work on contingency plans. Various community groups and local officials were also contacted. The model ordinance to protect public water wells was introduced to the communities of Ida, Rodessa, Belcher, Greenwood, Vivian, and the Caddo Parish Commission. Ordinance work is ongoing with these communities. A community meeting was held on September 17<sup>th</sup> at the Louisiana State Exhibit Museum in Shreveport. The meeting was attended by 30 people and 7 of the attendees volunteered for the new Caddo Parish Drinking Water Committee. Additional people subsequently volunteered. The first committee meeting was set for October 15<sup>th</sup> and preparations for it began soon after the community meeting.

## *Source Water Protection Strategy*

LDEQ's Source Water Protection Strategy is implemented through its Source Water Assessment Program and Source Water Protection Program. LDEQ's Source Water Protection Program is officially known in Louisiana as the Drinking Water Protection Program, however for this document, it will be referred to as the Source Water Protection Program to fit with EPA's nomenclature. The main goal of the LDEQ's Protection Strategy is to protect all sources of potable water (groundwater and surface water sources) for public water systems from contamination. Under the Source Water Assessment Program, LDEQ has located all public water supply sources and evaluated their susceptibility to contamination. The information derived from this Program is used by various sections within LDEQ, by various outside agencies, and directly in the implementation of the Source Water Protection Program in order to protect water supplies. The Source Water Protection Program operates on a parish or regional (combination of parishes) basis, depending on the local situation.

# *Source Water Protection Program*

Key elements of the Louisiana Source Water Protection Strategy consist of the following:

1. Maintenance of updated Source Water Assessment Program data, which includes information on sources of drinking water (wells or intakes) and a list of potential sources of contamination located near those drinking water sources.
2. Development of contingency plans for all water systems in each targeted community that will give those water systems a plan in place in the event of an emergency or the loss of the water supply.
3. Implementation of public education/awareness campaigns to educate the local public on where drinking water comes from, why it's important to protect it, and how it can be protected.
4. Formation of Source Water Protection Committees made up of local residents from the parish(s) being targeted at the time. Each Committee is trained on its role in drinking water source protection within its community and best management practices (BMPs) that may be used to control pollution in the vicinity of their drinking water supplies. Source water protection goals are set and carried out with each committee.
5. Distribution of BMPs to various businesses/activities that are considered potential sources of contamination as identified in the Source Water Assessment Program, in conjunction with the Source Water Protection Committees.
6. Development and distribution of educational/outreach material as needed for the community to help protect its drinking water, in conjunction with the Source Water Protection Committees.
7. Addressing the most threatening potential sources of contamination in each community.
8. Addressing specific issues affecting water sources that each committee and local community deems necessary.
9. Addressing the specific nonpoint sources of contamination that have been identified as affecting water supplies.
10. Working with each committee to get an ordinance passed by local governments which affords further protection of the drinking water source.

Implementation of scheduled source water protection strategies over the past year included:

- Signage: 107 Drinking Water Protection Area Signs were delivered to communities in Beauregard, Vernon, LaSalle, and Caddo parishes for placement on the highways at the boundaries of Source Water Protection Areas,
- Workshops: 5 community meetings, 25 local committee meeting, took place within 6 parishes (Vernon, Beauregard, Calcasieu, Ouachita, Caddo and LaSalle),
- Public Education and Outreach: 645 potential sources of contamination were visited by committee members, mainly in urban areas, educating citizens about potential pollution of their local drinking water source with an emphasis on nonpoint source pollution,
- There were 12 ordinances passed by local governments in 5 parishes prohibiting some nonpoint type activities within a certain distance from public drinking water wells during FY 2009,
- Wellhead Protection Programs/ Contingency Plans: 22 Wellhead Protection Programs and contingency plans were worked on by LDEQ staff. LDEQ strives to address specific nonpoint sources of contamination that have been identified as affecting water supplies within the framework of its Source Water Protection Program. This has become particularly important when working with surface water supplies. However, it is done as



# *Source Water Protection Program*

well for ground water supplies. Specific projects are utilized to address nonpoint source contamination, some of which have been mentioned above, such as used oil recycling education and visits to potential sources of contamination (some of which are nonpoint sources). LDEQ has also worked in some communities to educate citizens on individual sewage treatment system maintenance.



**The LDEQ Source Water Protection Team**

# Appendix A

## Appendix A List of projects by Basin that were active during FY 2009.

Bayou Lafourche Sewage Project	2003	Barataria
Coastal NPS BMP Training and Outreach- Phase 2	2003	coastal
Wastewater Treatment Plant Assistance in North Shore Watersheds	2003	Lake Pontchartrain Basin
St. Tammany Parish Tchefuncte and Bogue Falaya Watershed Implementation Project	2003	Lake Pontchartrain Basin
Pearl River Watershed Monitoring and Source Identification	2003	Pearl River Basin
Improving Water Quality Through an Integrated Watershed Approach in the Mermentau and Calcasieu River Basins	2003	statewide
Improving Water Quality through an Integrated Watershed Approach in the Red River and Ouachita Basins	2003	statewide
Technical assistance for Watershed Monitoring and Quality Assurance in the NPS Program	2003	statewide
Improving Water Quality Through an Integrated Watershed Approach in the Mermentau and Vermilion-Teche River Basins	2003	statewide
Improving water quality through an integrated watershed approach in the Ouachita River Basin	2003	statewide
Identifying critical nonpoint source areas of pollution to Bayou Courtableau	2003	Vermilion-Teche River Basin and Mermentau
Coulee Baton Home Sewage Micro-watershed Project	2004	Mermentau River Basin
Big Creek Coliform Sources	2004	Ouachita River Basin
Monitoring the Effectiveness of Forestry BMP Implementation in the Flat Creek, Phase 2	2004	Ouachita River Basin
Improving Water Quality through an Integrated Watershed Approach in the Lake Pontchartrain, Terrebonne, Pearl and Mississippi Basins	2004	statewide
Louisiana Forestry Best Management Practices Education Project Phase 2	2004	statewide
Approaches for Developing Attainable Nutrient Criteria for Louisiana Water Bodies: Rivers and Streams	2004	Statewide
GIS Analysis for Watershed Planning and Management	2004	statewide
Nutrients, Dissolved Oxygen Conditions, Habitat and Fish Assemblage	2004	Statewide
GIS Analysis for Watershed Planning and Management	2004	statewide
Model Landscape Code Design Standards	2004	statewide
Standards Development for Nutrient Criteria for Wetlands	2004	Statewide
Mapping Coastal Wetland Forests in Coastal Louisiana	2004	statewide
Water Quality Modeling to Support the Use of Natural Wetlands to Treat Non-point Source Pollution as a Restoration Goal for the Barataria Basin – Planning Project.	2005	Barataria

# Appendix A

Storm Water BMPs in Wetland Landscape Design Planning, Construction at Woodlawn High School	2005	Lake Pontchartrain Basin
Modeling NPS and Land-Use in Bayou Plaquemine Brule	2005	Mermentau River Basin
The Coulee Baton Microwatershed Nonpoint Source Pollution Monitoring and Modeling Project	2005	Mermentau River Basin
Bayou Wikoff Sub-Watershed of Bayou Plaquemine Brule Watershed Project	2005	Mermentau River Basin
Reduction in NPS Load in Bayou Chauvin	2005	Ouachita River Basin
Reduction of Pesticides and Nutrients in Bennett's Bayou Following Implementation of Best Management Practices (BMPs)	2005	Ouachita River Basin
Sibley Lake Watershed Individual Sewage Treatment System Improvement	2005	Red River Basin
Bayou Vermilion District	2005	Vermilion-Teche River Basin and Mermentau
Sibley Lake Watershed Individual Sewage Treatment System Improvement	2007	Red River Basin

# Appendix B

## Appendix B List of improved waterbodies.

Subsegment	Waterbody	Cause of Impairment	Reason for delisting
LA010401_00	East Atchafalaya Basin and Morganza Floodway South to I-10	Mercury in Fish Tissue	Applicable WQS attained; original basis for listing was incorrect
LA010601_00	Crow Bayou, Bayou Blue and Tributaries	Sulfates	Applicable WQS attained; reason for recovery unspecified
LA020301_00	Bayou Des Allemands-From US-90 to Lake Salvador	Chloride, Sulfates, TDS	Applicable WQS attained; reason for recovery unspecified
LA020302_00	Bayou Gauche	Chloride, Sulfates, TDS	Applicable WQS attained; reason for recovery unspecified
LA020303_00	Lake Cataouatche and Tributaries	Chloride, Sulfates, TDS	Applicable WQS attained; reason for recovery unspecified
LA020304_00	Lake Salvador	Chloride, Sulfates, TDS, Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA020401_00	Bayou Lafourche-From Donaldsonville to ICWW at Larose	Chloride, TDS	Applicable WQS attained; reason for recovery unspecified
LA020901_00	Bayou Rigolettes and Bayou Perot to Little Lake	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA020902_00	Little Lake	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA020904_00	Wilkinson Canal and Wilkinson Bayou	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA020905_00	Bayou Moreau	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA030201_00	Calcasieu River-Marsh Bayou to saltwater barrier	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA030402_00	Calcasieu Lake	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA030508_00	Bundicks Creek-From Bundicks Lake to Whiskey Chitto Creek	Lead	Applicable WQS attained; reason for recovery unspecified
LA030601_00	Barnes Creek-From headwaters to Little Barnes Creek	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA030806_00	Houston River-From Bear Head Creek to West Fork Calcasieu	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA031001_00	Bayou Choupique-From headwaters to ICWW	Oxygen, Dissolved; Turbidity	Applicable WQS attained; reason for recovery unspecified
LA040101_00	Comite River-Mississippi State Line to Wilson-Clinton Hwy.	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA040301_00	Amite River-From Mississippi state line to LA-37	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified



# Appendix B

Subsegment	Waterbody	Cause of Impairment	Reason for delisting
LA040403_00	Blind River-From headwaters to Amite River Diversion Canal	Nitrate/Nitrite; Oxygen, Dissolved; Phosphorus (Total); Sedimentation/Siltation; Turbidity	Applicable WQS attained; reason for recovery unspecified
LA040501_00	Tickfaw River-From Mississippi state line to LA-42	Fecal Coliform	Applicable WQS attained; due to restoration activities
LA040505_00	Pontchatoula Creek and Pontchatoula River	Lead	Applicable WQS attained; reason for recovery unspecified
LA040602_00	Lake Maurepas	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA040701_00	Tangipahoa River-From Mississippi state Line to I-12	Fecal Coliform	Applicable WQS attained; due to restoration activities
LA040801_00	Tchefuncte River-From headwaters to Bogue Falaya River	Fecal Coliform	Applicable WQS attained; due to restoration activities
LA040803_00	Tchefuncte River-From LA-22 to Lake Pontchartrain	Fecal Coliform; Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA040804_00	Bogue Falaya River-From headwaters to Tchefuncte River	Chloride	Applicable WQS attained; reason for recovery unspecified
LA040804_00	Bogue Falaya River-From headwaters to Tchefuncte River	Fecal Coliform	Applicable WQS attained; due to restoration activities
LA040901_00	Bayou Lacombe-From headwaters to US-190	Sulfates	Applicable WQS attained; reason for recovery unspecified
LA040902_00	Bayou Lacombe-From US-190 to Lake Pontchartrain	Fecal Coliform; pH, Low	Applicable WQS attained; reason for recovery unspecified
LA040903_00	Bayou Cane-From headwaters to US-190	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA040904_00	Bayou Cane-From US-190 to Lake Pontchartrain	Fecal Coliform, Turbidity	Applicable WQS attained; reason for recovery unspecified
LA040908_00	Bayou Bonfouca-From LA-433 to Lake Pontchartrain	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA041202_00	Bayou Trepagnier-From Norco to Bayou Labranche	Turbidity	Applicable WQS attained; reason for recovery unspecified
LA041601_00	Intracoastal Waterway-Inner Harbor Nav. Can. to Chef Menteur	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA041703_00	Intracoastal Waterway-From Chef Menteur Pass to Lake Borgne	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA041802_00	Bayou Chaperon	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA041803_00	Bashman Bayou-From headwaters to Bayou Dupre	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified

# Appendix B

Subsegment	Waterbody	Cause of Impairment	Reason for delisting
LA041804_00	Bayou Dupre-From Lake Borgne Canal to Terre Beau Bayou	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA041901_00	Mississippi River Gulf Outlet-ICWW to Breton Sound	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA042001_00	Lake Borgne	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA042002_00	Bayou Bienvenue-From Bayou Villere to Lake Borgne	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA042004_00	Bayou Bienvenue-From MRGO to Bayou Villere	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA042101_00	Bayou Terre Aux Boeufs	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA042103_00	Bayou Gentilly-From Bayou Terre Aux Boeufs to Lake Petite	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA042104_00	Petit Lake	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA042105_00	Lake Lery	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA050101_00	Bayou Des Cannes-From headwaters to Mermentau River	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA050201_00	Bayou Plaquemine Brule-From headwaters to Bayou Des Cannes	Fecal Coliform, Total Dissolved Solids	Applicable WQS attained; reason for recovery unspecified
LA050301_00	Bayou Nezpique-From headwaters to Mermentau River	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA050304_00	Bayou Blue-From headwaters to Bayou Nezpique	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA050602_00	Intracoastal Waterway-Calcasieu Basin to Mermentau River	Ammonia (Total); Nitrate/Nitrite; Oxygen, Dissolved; Phosphorus (Total)	Applicable WQS attained; reason for recovery unspecified
LA050701_00	Grand Lake	Ammonia (Total); Nitrate/Nitrite; Oxygen, Dissolved; Phosphorus (Total)	Applicable WQS attained; reason for recovery unspecified
LA050702_00	Intracoastal Waterway-Mermentau River to Vermilion Locks	Ammonia (Total); Nitrate/Nitrite; Oxygen, Dissolved; Phosphorus (Total)	Applicable WQS attained; reason for recovery unspecified
LA050702_00	Intracoastal Waterway-Mermentau River to Vermilion Locks	Mercury	Flaws in original listing
LA050802_00	Big Constance Lake; includes associated water bodies	Nitrate/Nitrite; Oxygen, Dissolved; Phosphorus (Total)	Applicable WQS attained; reason for recovery unspecified

# Appendix B

Subsegment	Waterbody	Cause of Impairment	Reason for delisting
LA060101_00	Spring Creek-From headwaters to Cocodrie Lake (Scenic)	Oxygen, Dissolved; Sedimentation/Siltation; Total Suspended Solids (TSS); Turbidity	Applicable WQS attained; reason for recovery unspecified
LA060102_00	Cocodrie Lake	Chloride, Sulfates, Total Dissolved Solids, Turbidity	Applicable WQS attained; reason for recovery unspecified
LA060201_00	Bayou Cocodrie-US-167 to Bayou Boeuf-Cocodrie Div. Canal	Copper	State Determines water quality standard is being met
LA060201_00	Bayou Cocodrie-US-167 to Bayou Boeuf-Cocodrie Div. Canal	Sedimentation/Siltation; TDS; Total Suspended Solids (TSS); Turbidity	Applicable WQS attained; reason for recovery unspecified
LA060203_00	Chicot Lake	Sedimentation/Siltation; Total Suspended Solids (TSS); Turbidity	Applicable WQS attained; reason for recovery unspecified
LA060204_00	Bayou Courtableau-To West Atchafalaya Borrow Pit Canal	Ammonia (Total); Fecal Coliform; Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA060206_00	Indian Creek and Indian Creek Reservoir	Temperature, water	Applicable WQS attained; reason for recovery unspecified
LA060208_00	Bayou Boeuf-From headwaters to Bayou Courtableau	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA060209_00	Irish Ditch/Big Bayou-Unnamed Ditch to Bayou Rapides	Chloride	Applicable WQS attained; reason for recovery unspecified
LA060212_00	Chatlin Lake Canal and Bayou DuLac	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA060301_00	Bayou Teche-From headwaters to Keystone Locks and Dam	Fecal Coliform; Sedimentation/Siltation; Total Suspended Solids (TSS); Turbidity	Applicable WQS attained; reason for recovery unspecified
LA060401_00	Bayou Teche-From Keystone Locks and Dam to Charenton Canal	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA060501_00	Bayou Teche-From Charenton Canal to Wax Lake Outlet	Nitrate/Nitrite; Oxygen, Dissolved; Phosphorus (Total); Sedimentation/Siltation; Total Suspended Solids (TSS); Turbidity	Applicable WQS attained; reason for recovery unspecified
LA060701_00	Tete Bayou	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA060702_00	Lake Fausse Point and Dauterive Lake	Nitrate/Nitrite; Oxygen, Dissolved; Phosphorus (Total)	Applicable WQS attained; reason for recovery unspecified
LA060703_00	Bayou du Portage	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA060802_00	Vermilion River-From LA-3073 bridge to ICWW	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA060803_00	Vermilion River Cutoff-From ICWW to Vermilion Bay	Nitrate/Nitrite; Oxygen, Dissolved; Phosphorus (Total)	Applicable WQS attained; reason for recovery unspecified

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Subsegment	Waterbody	Cause of Impairment	Reason for delisting
LA060901_00	Bayou Petite Anse-From headwaters to Bayou Carlin	Fecal Coliform, Total Suspended Solids (TSS)	Applicable WQS attained; reason for recovery unspecified
LA060902_00	Bayou Carlin-From Lake Peigneur to Bayou Petite Anse	Total Suspended Solids (TSS)	Applicable WQS attained; reason for recovery unspecified
LA060904_00	New Iberia Southern Drainage Canal-From headwaters to ICWW	Total Suspended Solids (TSS), Turbidity	Applicable WQS attained; reason for recovery unspecified
LA060909_00	Lake Peigneur	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA060911_00	Dugas Canal-By Tiger Lagoon Oil and Gas Field	Fecal Coliform, Total Suspended Solids (TSS)	Applicable WQS attained; reason for recovery unspecified
LA061001_00	West Cote Blanche Bay	Nitrate/Nitrite; Oxygen, Dissolved; Phosphorus (Total)	Applicable WQS attained; reason for recovery unspecified
LA061103_00	Freshwater Bayou Canal-From ICWW to control structure	Nitrate/Nitrite; Oxygen, Dissolved; Phosphorus (Total)	Applicable WQS attained; reason for recovery unspecified
LA070601_00	Mississippi River Basin Coastal Bays and Gulf Waters	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA080101_00	Ouachita River-Arkansas state line to Columbia Lock & Dam	Nitrate/Nitrite; Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA080101_00	Ouachita River-Arkansas state line to Columbia Lock & Dam	Phosphorus (Total)	Applicable WQS attained; reason for recovery unspecified
LA080601_00	Bayou D'Arbonne-From headwaters to Lake Claiborne	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA080603_00	Bayou D'Arbonne-From Lake Claiborne to Bayou D'Arbonne Lake	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA080606_00	Cypress Creek-From headwaters to Bayou D'Arbonne	Total Dissolved Solids	Applicable WQS attained; reason for recovery unspecified
LA080906_00	Turkey Creek-From Turkey Creek Cutoff to Turkey Creek Lake	Chloride	Applicable WQS attained; reason for recovery unspecified
LA081301_00	Little River-From Archie Dam to Ouachita River	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA081501_00	Castor Creek-From headwaters to Little River	Chloride	Applicable WQS attained; reason for recovery unspecified
LA081603_00	Catahoula Lake	Oil and Grease	Applicable WQS attained; according to new assessment method
LA090101_00	Pearl River-From Miss state line to Pearl River Nav Canal	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA090104_00	Peters Creek-From headwaters to Pearl River	pH, Low	Applicable WQS attained; reason for recovery unspecified



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Subsegment	Waterbody	Cause of Impairment	Reason for delisting
LA090107_00	Pearl River-Pearl River Navigation Canal to Holmes Bayou	Chloride	Applicable WQS attained; reason for recovery unspecified
LA090201_00	West Pearl River-From headwaters to Holmes Bayou	Turbidity	Applicable WQS attained; reason for recovery unspecified
LA090301_00	Pushepatapa Creek-Miss state line to Pearl River floodplain	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA090504_00	Lawrence Creek-From headwaters to Bogue Chitto River	pH, Low	Applicable WQS attained; reason for recovery unspecified
LA090505_00	Bonner Creek-From headwaters to Bogue Chitto River	pH, Low	Applicable WQS attained; reason for recovery unspecified
LA100101_00	Red River-From Arkansas state line to US-165 in Alexandria	Color	Applicable WQS attained; reason for recovery unspecified
LA100302_00	Black Bayou Lake-From LA-1 to spillway	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA100309_00	Cross Bayou-From Texas state line to Cross Lake	Color	Applicable WQS attained; reason for recovery unspecified
LA100701_00	Black Lake Bayou-Headwaters to 1 mile north of Leatherman Cr	pH, Low	Applicable WQS attained; reason for recovery unspecified
LA100708_00	Castor Creek Tributary-From headwaters to Castor Creek	pH, Low	Applicable WQS attained; reason for recovery unspecified
LA100709_00	Grand Bayou-From headwaters to Black Lake Bayou	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA100709_00	Grand Bayou-From headwaters to Black Lake Bayou	Mercury in Fish Tissue	Applicable WQS attained; original basis for listing was incorrect
LA100803_00	Saline Bayou-From Saline Lake to Red River	Mercury in Fish Tissue	Applicable WQS attained; original basis for listing was incorrect
LA100901_00	Nantaches Creek-From headwaters to Nantaches Lake	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA101103_00	Bayou Kisatchie-From Kisatchie National Forest to Old River	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA101201_00	Cotile Reservoir	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA101301_00	Rigolette Bayou-From headwaters to Red River	Fecal Coliform; pH, Low	Applicable WQS attained; reason for recovery unspecified
LA101401_00	Buhlow Lake near Pineville	Oxygen, Dissolved; Turbidity	Applicable WQS attained; reason for recovery unspecified
LA101505_00	Larto Lake	Oxygen, Dissolved; Sulfates; TDS; Turbidity	Applicable WQS attained; reason for recovery unspecified

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Subsegment	Waterbody	Cause of Impairment	Reason for delisting
LA101506_00	Big Creek-From headwaters to Saline Lake	pH, Low	Applicable WQS attained; reason for recovery unspecified
LA101602_00	Cocodrie Lake	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA101606_00	Bayou Cocodrie-From Wild Cow Bayou to Red River	Nitrate/Nitrite; Oxygen, Dissolved; Phosphorus (Total)	Applicable WQS attained; reason for recovery unspecified
LA110202_00	Pearl Creek-From headwaters to Sabine River	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA110401_00	Bayou Toro-From headwaters to LA-473	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA110402_00	Bayou Toro-From LA-473 to Sabine River	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA110501_00	West Anacoco Creek-From headwaters to Vernon Lake	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA110502_00	East Anacoco Creek-From headwaters to Vernon Lake	Oxygen, Dissolved	Applicable WQS attained; reason for recovery unspecified
LA110504_00	Bayou Anacoco-From Vernon Lake to Anacoco Lake	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA110601_00	Vinton Waterway-From Vinton to ICWW	Turbidity	Applicable WQS attained; reason for recovery unspecified
LA120103_00	Bayou Choctaw-From Bayou Poydras to Bayou Grosse Tete	Atrazine	State Determines water quality standard is being met
LA120104_00	Bayou Grosse Tete-From headwaters to ICWW near Wilbert Canal	Atrazine	Applicable WQS attained; reason for recovery unspecified
LA120109_00	Intracoastal Waterway-Port Allen Locks to Bayou Sorrel Locks	Sulfates	Applicable WQS attained; reason for recovery unspecified
LA120110_00	Bayou Cholpe-From headwaters to Bayou Choctaw	Sulfates	Applicable WQS attained; reason for recovery unspecified
LA120111_00	Bayou Maringouin-Headwaters to E Atchafalaya Basin Levee	Atrazine	Applicable WQS attained; reason for recovery unspecified
LA120201_00	Lower Grand Riv/Belle Riv-Bayou Sorrel Lock to Lake Palourde	Sulfates	Applicable WQS attained; reason for recovery unspecified
LA120405_00	Lake Hache and Lake Theriot	Turbidity	Applicable WQS attained; reason for recovery unspecified
LA120505_00	Bayou Du Large-From Houma to Marmande Canal	Chloride, Sulfates, TDS	Applicable WQS attained; reason for recovery unspecified
LA120508_00	Houma Nav Canal-Bayou Pelton to so of Bayou Grand Caillou	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA120604_00	Bayou Blue-From ICWW to Grand Bayou Canal	Total Dissolved Solids	Applicable WQS attained; reason for recovery unspecified

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Subsegment	Waterbody	Cause of Impairment	Reason for delisting
LA120606_00	Bayou Blue-From Grand Bayou Canal to Bully Camp Canal	Fecal Coliform	Applicable WQS attained; reason for recovery unspecified
LA120707_00	Lake Boudreaux	Fecal Coliform; Nitrate/Nitrite; Oxygen, Dissolved; Phosphorus (Total)	Applicable WQS attained; reason for recovery unspecified